

SCIENCE

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FRIDAY, FEBRUARY 3, 1899.

CONTENTS:

<i>Frontal Horn on Aceratherium incisivum</i> (with Plate I): PROFESSOR HENRY F. OSBORN.....	161
<i>Report concerning the Official State Bureaus connected with the Johns Hopkins University:</i> PROFESSOR WILLIAM BULLOCK CLARK.....	162
<i>The Biological Stations of Brittany:</i> DR. JOHN H. GEROULD	165
<i>Notes on the Times of Breeding of some Common New England Nemerteans:</i> DR. W. R. COE.....	167
<i>The Columbia Meeting of the Society for Plant Morphology and Physiology:</i> PROFESSOR W. F. GANONG	169
<i>Eleventh Annual Meeting of the American Folk-lore Society:</i> W. W. NEWELL	173
<i>Scientific Books:—</i>	
<i>Keilhack's Kalender für Geologen, Paläontologen und Mineralogen:</i> J. B. WOODWORTH. <i>Webster on the Chinch Bug:</i> PROFESSOR T. D. A. COCKERELL. <i>Newth's Manual of Chemical Analysis:</i> DR. HENRY FAY. <i>Recent Publications of the U. S. Geological Survey. Books Received.....</i>	174
<i>Scientific Journals and Articles.....</i>	178
<i>Societies and Academies:—</i>	
<i>Wisconsin Academy of Sciences, Arts and Letters:</i> DR. A. S. FLINT. <i>The Ohio Academy of Science:</i> PROFESSOR R. C. OSBURN. <i>Entomological Society of Washington:</i> DR. L. O. HOWARD. <i>The Academy of Sciences of Philadelphia:</i> DR. EDW. J. NOLAN. <i>Zoological Club of the University of Chicago:</i> MARY M. STURGES, PROFESSOR R. S. LILLIE.....	179
<i>Discussion and Correspondence:—</i>	
<i>The Storing of Pamphlets:</i> PROFESSOR WINSLOW UPTON.....	184
<i>Notes on Inorganic Chemistry:</i> J. L. H.....	185
<i>Current Notes on Anthropology:—</i>	
<i>Bad Form in Anthropological Writings; The Mangyans of Mindoro; The Jew and the Gypsy:</i> PROFESSOR D. G. BRINTON	185
<i>Agricultural Education in Russia.....</i>	186
<i>The International Catalogue of Scientific Literature..</i>	187
<i>Scientific Notes and News.....</i>	188
<i>University and Educational News.....</i>	192

MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor J. McKeen Cattell, Garrison-on-Hudson N. Y.

FRONTAL HORN ON ACERATHERIUM INCISIVUM.

RELATION OF THIS TYPE TO ELASMOTHERIUM.

IN the classical collection of the Museum of Darmstadt there are the two type skulls of *Aceratherium incisivum*, Kaup, which have hardly been disturbed since the death of that distinguished paleontologist. Through the kindness of Professor G. Richard Lepsius, the writer was recently enabled to carefully examine these skulls, which are in a fragile condition. A slight rugosity was observed upon the frontal bones just behind their junction with the nasals, and a very careful examination demonstrated to both Professor Lepsius and the writer the undoubted presence of a rudimentary frontal horn in this typical hornless type. Even more distinctive proof of the existence of a horn is afforded by the characteristic convergence towards the center of the rugosity of a number of small grooves which indicate the course of the blood vessels which supplied the horn. The support of a horn is further indicated by a distinct swelling of the skull above the orbits which is observed with especial distinctness in the profile view. This swelling will probably be found to consist of a thickening of the frontals at this point.

This discovery is of the very greatest interest. In the first place it practically removes this typical *Aceratherium* from the group to which it has given its name and places it among the Rhinoceroses. Second,

the precocious development of the frontal horn, and the marked reduction of the nasals, at once suggested to the writer that this animal may possibly represent an ancestor of *Elasmotherium*, which, as is well known, was distinguished from all other Rhinoceroses by the smooth, narrow nasals and enormously developed frontal horns, as shown in the accompanying figures. It is true that in *A. incisivum* the horns are small, the rugosity, or horn core, being rudimentary; but in paleontology a rudiment is almost invariably prophetic of a fully developed organ in a later horizon. The question whether this type actually marks the first branching-off of the Elasmotheres from the Aceratheres turns, therefore, upon a detailed comparison of the skull and skeleton of the two types. Both skulls are dolichocephalic with high occiputs. A marked difference is seen in the very narrow space between the orbit and narial opening in *A. incisivum*, as compared with the broad space in *Elasmotherium*. These and other differences may be due to profound changes which occurred during the Pliocene period, for *Elasmotherium* is a well-advanced Pleistocene type. Other profound changes which would be involved in such a transformation are in the loss of old cutting teeth and the folding of the enamel in the molar teeth, so characteristic of the Pleistocene form.

Taken altogether, the evidence that *A. incisivum* is an ancestral Elasmotheres is, however, decidedly slender at present, and we must probably await the discovery of intermediate stages in the Pliocene of Europe or Asia.

HENRY F. OSBORN.

REPORT CONCERNING THE OFFICIAL STATE
BUREAUS CONNECTED WITH THE JOHNS
HOPKINS UNIVERSITY.*

I SUBMIT for your information the following report concerning the Maryland Geo-

* A report presented to the President of the Johns Hopkins University.

logical Survey and the Maryland Weather Service during the past year. Much of the work of these bureaus is carried on in co-operation with the Geological Department, and the offices are provided by the University free of all charges to the State.

THE MARYLAND GEOLOGICAL SURVEY.

The Maryland Geological Survey, which was established by an act of the General Assembly of 1896, began operations upon March 25th of that year, when, by the action of the Commission designated by the act, the organization of the Survey was formally effected. The General Assembly of 1898 passed two additional acts which added largely to the powers of the State Survey Commission by providing for the construction of topographic maps and the investigation of the question of proper highways for the State. By the first act an additional appropriation of \$5,000 annually was granted, while the second act appropriated \$10,000 annually, the original appropriation of \$10,000 annually by the Assembly of 1896 still remaining in force. By these acts the Survey received the very generous appropriation of \$25,000 annually.

During the two and a-half years that the Survey has been in operation several lines of investigation have been taken up, some of which have already been followed to a conclusion. The preliminary survey of the State, in which general information in regard to the geology and economic resources was secured, placed the Survey in a position to inaugurate those lines of investigation which would prove most beneficial to the people of the State and at the same time would contribute most largely to the sum of knowledge regarding the stratigraphy and structure of Maryland. In connection with this general survey there has been maintained a system of collection of statistical data regarding the output of each industry that has to do with the mineral

wealth of the State. Forms are annually placed in the hands of the producers of mineral products, which upon their return are filed at the office of the Survey. In this manner an accurate account is kept of the mineral products of the State, which aggregate in value from six to seven million dollars annually.

The work of the Survey has been systematically divided and a competent man placed in charge of each one of the divisions. Dr. E. B. Mathews, in addition to his duties as Assistant State Geologist, is Chief of the Division of Geology of the Piedmont Plateau; Professor Charles S. Prosser is in charge of the Division of Geology of the Appalachian Region, and Dr. George B. Shattuck is in charge of the Division of the Coastal Plain. The work of the Survey embraces many subjects related to geology, among which is the investigation of our highways, Dr. H. F. Reid being Chief of the important Division of Highways. Dr. L. A. Bauer is in charge of the Division of Terrestrial Magnetism. Several special assistants in charge of independent lines of work are also employed: Mr. A. N. Johnson in Highway Engineering; Dr. Cleveland Abbe, Jr., in Physiography, and Messrs. Basil Sollers and B. W. Barton in Botany.

At the same time active cooperation is maintained with several of the Washington bureaus, especially with the U. S. Geological Survey and the bureaus and divisions of the U. S. Department of Agriculture. The aid which has been rendered by the Washington scientific departments has been of great importance to the successful prosecution of the State work.

The topographic work of the Survey has been much extended during the past year, an area of several hundred square miles having been surveyed upon a scale of one mile to an inch in western Allegany and Garrett counties. The surveying force is

provided by the U. S. Geological Survey through a plan of cooperation between the national bureau and the Maryland Geological Survey.

The magnetic work under the charge of Dr. Bauer was continued in the western part of Maryland. Dr. Bauer completed his work on the western boundary of the State during 1897, and was able to be of great service to the Attorney-General of Maryland, who had the matter in charge. All the magnetic and astronomical work was placed in charge of Dr. Bauer, and he was throughout recognized as the scientific authority upon the State force. During the summer of 1898 a part of Dr. Bauer's time was taken up in the survey of the boundary line between Allegany and Garrett counties, which had been authorized by a special act of the last General Assembly. This work, which had been many times unsuccessfully attempted, was satisfactorily accomplished, and a report published in September.

The more strictly geological work of the Survey was carried on by the instructors and students of the Geological Department of the University, with such cooperation as was deemed necessary along special lines. Professor George P. Merrill, of the United States National Museum, rendered the Survey a very important service in the conduct of the investigations upon the building and decorative stones of the State. Extensive areal and economic work was conducted both in the western and central counties of the State. Surveys of Allegany and Garrett counties were completed and a large amount of data collected for the special economic reports which will appear later.

The highway investigations have occupied the attention of the Survey since the spring of the present year, and a considerable force was employed under the direction of Dr. Reid and his associate, Mr. Johnson, in the study of the highway conditions of

Maryland. The distribution of those rocks which are adapted for highway construction has been carefully surveyed and points for the subsequent locations of quarries of road metals indicated.

The agricultural conditions of the State have also been considered and a study made of many of the relations of the geological formations to the soils derived from them. This classification of the soils has been conducted under a plan of cooperation with Professor Milton Whitney, of the U. S. Department of Agriculture and the Maryland Experiment Station, and, outside of its scientific interest, will prove of much practical benefit to the agricultural interests of the State.

The distribution of plant and animal life is so closely connected with the soils and geology that the Survey plans a study of the fauna and flora from this standpoint. Already some work has been done under the direction of Messrs. Sollers and Barton upon the botany of Maryland, more particularly in the western counties. It is planned in the future to carry on this work in cooperation with the newly organized State Horticultural Bureau.

Much advance was made during the year in the preparation of the manuscript for subsequent volumes. Professor Merrill completed his work upon the Building and Decorative Stones of Maryland, and Mr. Henry Gannett, of the U. S. Geological Survey, furnished an elaborate treatise upon the Aims and Methods of Topographic Work for the report upon the cartography of the State. These and other reports by the regular staff of the Survey are now being collected for the second volume, which will be brought out during the autumn of 1898.

THE MARYLAND WEATHER SERVICE.

The Maryland Weather Service was established in May, 1891, under the joint

auspices of the Johns Hopkins University, the Maryland Agricultural College and the United States Weather Bureau, and became an official organization by an act of the General Assembly approved by the Governor April 6, 1892. Under authority granted by this act the Maryland Weather Service was permanently established at the Johns Hopkins University, under the direction of a Board of Control nominated by the heads of the institutions above mentioned and commissioned by the Governor.

During the first five years of the existence of the Service the investigations were confined largely to a study of the general meteorological conditions of the State. Numerous stations were established in the different counties, volunteer observers having been obtained at a sufficient number of points to render it possible to determine the more important features of the climate of the State. Throughout the same time monthly Meteorological Reports, extending through the year, and weekly Crop Bulletins, covering the growing and harvesting seasons, were published. Two biennial reports to the General Assemblies of 1894 and 1896 were also prepared and subsequently printed with the necessary maps, diagrams and tables. A series of large Climatic Charts was also published and placed on exhibition in the Maryland Building in Chicago at the time of the Columbian Exposition, and copies of the same were subsequently distributed.

Somewhat over a year ago an entire reorganization of the work of the Maryland Weather Service was effected. It seemed desirable to transfer the accumulation of the general climatic data to the Climate and Crop Service of the Weather Bureau, which is much more fully equipped for carrying on that phase of the work, and to devote the money and energies of the Maryland Weather Service to the study of special problems connected with the climatology of the State. It was thought possible, by con-

ducting the work in close cooperation with the State Geological Survey, the State agricultural institutions and the United States Department of Agriculture, to take up lines of research that would be of much permanent value to the people of the State. Arrangements were made for the publication of these investigations in a new series of reports which should conform in all particulars to those already adopted for the State Geological Survey. These volumes, for which arrangements have now been perfected, will contain the results of investigations upon the climate of the State and will include reports upon the physiography, meteorology, medical climatology, agricultural soils, forestry, hydrography, crop conditions, botany and zoology of Maryland.

The reports upon physiography and meteorology are already largely prepared and will constitute the first volume of the series. Dr. Cleveland Abbe, Jr., has prepared a report upon the physiography, while the longer and more elaborate statement regarding the meteorology of the State is divided into three parts, the general treatment of the subject being from the pen of the distinguished Professor Cleveland Abbe, of the U. S. Weather Bureau. Mr. F. J. Waltz, the Local Forecast Official of the U. S. Weather Bureau in Baltimore and the Meteorologist of the State Weather Service, will contribute the part relating to the meteorology of the State; while Mr. O. L. Fassig, his associate, will prepare those chapters which relate to the history of meteorological investigations in Maryland since early colonial days. The cordial support of Professor Willis L. Moore, Chief of the U. S. Weather Bureau, has been secured in this work, as well as in many of the lines of special investigations which will be later pursued.

The investigation of the agricultural soils of the State, already referred to in connection with the State Geological Sur-

vey, are closely related to many of the climatological problems which will be considered in the future, and the active cooperation of Professor Whitney along these lines will add much to the effectiveness of the State work. Mr. C. W. Dorsey, of the State Agricultural Experiment Station, has been carrying on investigations in this field under the supervision of Professor Whitney, and the results of their combined work will be later brought out in the reports of the State Weather Service.

The questions of hydrography are closely related to those of climatology, and already considerable progress has been made in the study of the drainage basins of Maryland through the cooperation secured from Professor Newell, in charge of the Division of Hydrography of the U. S. Geological Survey, and special reports upon this subject will be incorporated in a later volume of the State Weather Service.

The other lines of investigation above referred to have been projected, but little work has been done upon them thus far. They will occupy the attention of the local Service during the coming and subsequent years.

WM. BULLOCK CLARK,
State Geologist and Director State Weather Service.

THE BIOLOGICAL STATIONS OF BRITTANY.

THE marine laboratories of the coasts of France and England can be reached with so little loss of time by students of zoology and botany who live near the Atlantic seaboard in America that a knowledge of the facilities for work at these stations and of their accessibility is of great importance to Americans.

Aside from the hygienic advantages of the ocean voyage and a complete change of scene to a hard-working naturalist who devotes his summer vacations to scientific research, one will in many cases find at some

of the marine laboratories of France or of Great Britain such favorable conditions for his work as cannot be obtained in connection with our own excellent laboratories.

It is with this thought in mind that I call the attention of the readers of SCIENCE to two of the stations for the study of marine biology which are situated in Brittany.

The *Laboratoire de Zoologie Expérimentale* at Roscoff, in Finistère, is under the direction of its founder, Monsieur le professeur de Lacaze-Duthiers, of the Sorbonne, whose hospitality to foreigners is most generous.

Roscoff may be quickly reached from Southampton by the boat to St. Malo, a Breton seaport, or from Harve *via* Paris. It is a quaint old town, with a port devoted to the export of vegetables to England; its narrow streets, among the ancient buildings of the village, are busy with the activities of the honest, sturdy Breton peasantry. The picturesque surrounding country, with its dolmens and menhirs, medieval chateaux and churches, attracts during the summer large numbers of tourists.

The laboratory at Roscoff is a building of the 16th century which faces, on the east, the principal public square. Ivy covered gables and round towers project behind into an enclosed garden. Between the garden and the sea, at the north, is a large grass-roofed aquarium room, with two spacious stone basins in the middle and numerous tanks along the north and south sides of the building. These are supplied with running seawater, which is pumped from a large stone vivarium situated between the aquarium and the sea.

Opening into the aquarium room is the main laboratory for investigators, with eight tables, in addition to which four private work rooms are at the disposal of the Director, besides those of himself and of his staff. The laboratory, which, like the other marine laboratories in France, is supported by the State, is well equipped with reagents,

*stains, glassware, etc., and a dark room is provided for photographic work.

As regards the fauna, the fact is to be emphasized that for plankton studies Roscoff is badly situated, whereas for shore collecting its position is admirable. The invertebrate fauna, especially, is very rich. The coast is diversified with numerous rocky islands and with bays which have a bottom of mud, sand or shingle. The spring tides at Roscoff rise and fall, at their maximum, about nine meters, so that a very large area is exposed at low tide.

Thirty-one investigators and elementary students during the summer of 1898 availed themselves of the advantages of this excellent laboratory. The venerable Director of the station made a brief visit in August. The following were engaged with special studies:

Monsieur L. Boutan, the Embryology of *Acmea*, *Haliotis* and *Scallaria*; Professor Y. Delage, Experiments upon Fertilization of the Egg of *Echinus*; Doctor Dominici, Hematopoesis in the Chordata (*Selachians* and *Amphioxus*); Professor P. Francotte, of Brussels, Maturation and Fertilization of the Egg in *Turbellaria*; Dr. J. Georgévitch, of Belgrade, Embryology of *Dentalium*; Dr. N. Koltzoff, of St. Petersburg, Embryology of the Head of *Elasmobranchs*; Monsieur A. Robert, Embryology of *Trochus*; Monsieur P. Vignon, Excretion in the *Crustacea*.

The present writer was occupied with the Embryology of *Phascolosoma*.

Professor Chalon, of Brussels, studied and made collections of the *Algæ*.

The *Laboratoire de Zoologie et de Physiologie maritimes* at Concarneau is under the charge of Professor Fabre-Domergue, of the Collège de France. Founded in 1859 by Monsieur Coste, it is said to be the oldest marine laboratory in existence.

Concarneau is a village of southern Brittany, near the picturesque and beautiful

town of Quimper. Like Roscoff, it can be easily reached by the way of Southampton and St. Malo or from Havre *via* Paris. Fishing and sardine packing are the principal industries of the place. The port and the surrounding country are so picturesquely beautiful that many artists make their permanent residence in the vicinity.

The laboratory is chiefly devoted to fish culture and the study of fishes, although work at the station is by no means restricted to this group. The building has two floors; the first story is devoted to the scientific apparatus, to spacious private rooms for a small number of investigators, a library and a dark room for photography; and the basement contains large stone tanks and other aquaria, provided with running seawater. Large vivaria, designed for holding fish, lobsters, etc., for scientific purposes and for the use of fishermen, adjoin the laboratory and extend out into the sea. The station is well equipped for scientific research. Here Selenka and other eminent zoologists have done much of their best work.

The plankton at Concarneau is said to be very rich, and certain forms of invertebrates which inhabit a sandy shore and which do not occur at Roscoff are found in abundance at Concarneau.

Finally, it should be said that the Directors of these and of other marine stations in France which it has been the good fortune of the present writer to visit are most hospitable and generous to American zoologists. One may be assured that if he goes to the coast of France to study he will receive a hearty welcome.

JOHN H. GEROULD.

STAZIONE ZOOLOGICA,
NAPLES, December 8, 1898.

NOTES ON THE TIMES OF BREEDING OF SOME COMMON NEW ENGLAND NEMERTEANS.

SEVERAL papers by Professor Bumpus have appeared in this JOURNAL on the

times of breeding of invertebrates at Woods Holl, Mass. In connection with these the following notes on the nemerteans may prove of interest to some who may desire to carry on researches on the embryology of this neglected group of worms.

It does not seem to be generally known that the eggs of some of our nemerteans can be obtained in abundance at almost any season of the year; that those of many species can be artificially fertilized, and that they will develop readily in confinement. Even in the case of those which undergo an indirect course of development the embryos can readily be reared to the early pilidium-stage. The eggs of some of the common species, moreover, are so very transparent that many of the phenomena involved in maturation, fertilization and cleavage can be followed in the living ovum without the use of stains. For these reasons they afford most promising objects for embryological and cytological investigation.

1. The eggs of *Amphiporus ochraceus* Verr. are laid during the months of May and June (or sometimes earlier) in the vicinity of New Haven. Worms which are kept in captivity sometimes deposit their ova in clusters of forty or more imbedded in a common mass of mucus. They develop readily in confinement, and the young worms may be kept alive until they attain a considerable size. As in most other Hoplonemerteans the development is direct.

2. *Amphiporus virescens* Verr. Eggs mature at Woods Holl in July and August. They develop readily when laid in captivity, although the number of eggs produced by a single worm is small.

3. *Tetrastemma candidum* Oersted. Mature in July and August at Woods Holl and New Haven.

4. *Tetrastemma vermiculus* (Quatr.) Stimp. Common on piles at Woods Holl with ripe ova in August.

Several other species of *Tetrastemma* and *Amphiporus* have been found mature in mid-summer.

5. *Emplectonema giganteum* Verr. has been found by Professor Verrill with large eggs in August.

6. *Lineus viridis* Johnson = *L. gesserensis* Müller = *Nemertes obscura* Desor = *Lineus obscurus* Barrois. On the Coast of Maine Verrill* has found the eggs of this species very abundant under stones at low-water mark. These were imbedded in mucus and were deposited in mid-summer. At Woods Holl during three summers I have examined thousands of specimens but have found no eggs. On the northern coast of Europe the eggs are mature from March to May. The development of this species was studied by Desor† as early as 1848 from material which he collected near Boston in February. Barrois‡ and, later, Hubrecht§ have published detailed descriptions of its embryology.

7. *Lineus socialis* (Leidy) Verr. The eggs mature in mid-winter at New Haven, and are sometimes deposited in captivity in masses of mucus. They develop readily at least to the stage of swimming gastrulæ.

8. *Lineus bicolor* Verr. Specimens dredged in Vineyard Sound in July, 1898, contained mature genital products.

9. *Micrura affinis* Verr. Specimens taken off Salem by Professor Verrill contained fully developed eggs and spermatozoa in mid-summer.

10. *Micrura cæca* Verr. Matures its genital products at Woods Holl during August. The eggs of this species are beautifully clear and transparent and develop readily when artificially fertilized. The cleavage

is of the regular spiral type, of which these eggs furnish an almost ideal illustration. The pilidium which results will live two weeks or more in confinement.

11. *Cerebratulus lacteus* Verr. The eggs are ripe at New Haven during February, March and April. On the coast of Maine the species is said to breed in early summer. I have never observed that the eggs are deposited in captivity. Specimens filled with eggs have been kept alive in the laboratory for more than two months after the time of full maturity of the sexual products without discharging their eggs. Whether they would be capable of normal development after this length of time I was unable to determine, because all the males which could be obtained had long since discharged their spermatozoa. The worms attain an enormous size (up to 22 feet in length and an inch in breadth, according to Verrill) and consequently produce an immense number of ova. I should estimate the number to be obtained from a fair-sized worm—say, 5 feet long—to lie between fifty thousand and a quarter of a million. A single individual, or even a small fragment, will thus furnish all the material required for an elaborate investigation. The eggs are easily fertilized artificially, and will develop into the pilidium-stage without difficulty.

12. *Cerebratulus Leidyi* Verr. Breeds commonly at Woods Holl in July and early in August. In 1898 the majority of the individuals which I found at Woods Holl had discharged their genital products earlier than July, and in 1894 a few specimens at New Haven retained their ova as late as October. Among the nemerteans that I know, the eggs of this species are equalled in beauty and regularity of development only by those of *Micrura cæca*. The first division occurs about one hour and ten minutes after fertilization, or in 55 minutes if the eggs have been allowed to

* *Trans. Connecticut Acad.*, Vol. 8, 1892.

† *Boston Journ. Nat. Hist.*, Vol. 6, 1848.

‡ *Recherches sur l'embryologie des Nemertes*. Lille, 1877.

§ *Proeve eener Ontwikkelingsgeschiedenis van Lineus obscurus*. Utrecht, 1885.

remain in the water until the formation of the first polar spindle, before being fertilized. The second cleavage takes place about 24 minutes later; the third cleavage occurs after 30 minutes more; the fourth after another 35 or 40 minutes; and after a further lapse of about 50 minutes, or in a little less than $3\frac{1}{2}$ hours after fertilization, the fifth division, with its resulting 32 cells, is completed. A very symmetrical blastula appears about $7\frac{1}{2}$ hours after the eggs are fertilized, and in $11\frac{1}{2}$ hours more the embryos begin to swim. The third cleavage, which is distinctly right-handed, shows the first differentiation of the cells in regard to size; the upper four, or those next to the polar bodies, being slightly, though perceptibly, larger than the lower four. The cleavage is typically spiral and almost perfectly regular. There are only the slightest indications of a vitelline membrane, so that the polar bodies are lost at an early stage. The near equality in the size of the blastomeres also tends to increase the difficulties encountered in following out the details of the cell-lineage. The pilidium with peculiarly short side-lobes, which develops from these eggs, will live for two weeks or more in the laboratory, although I have never seen the young nemertean develop within it.

13. *Cerebratulus luridus* Verr. Specimens collected in Cape Cod Bay by Professor Verrill contained apparently ripe eggs in August.

14. *Carinella pellucida* Coe ripens its sexual elements in July at New Haven and Woods Holl.

15. *Parapolia aurantiaca* Coe. Genital products mature in August at Woods Holl.

16. *Valencinia rubens* Coe. A single specimen found at Woods Holl in August 1894 was filled with ripe spermatozoa.

17. *Cephalothrix linearis* Oersted. At Woods Holl this species commonly matures its genital products in August. The eggs may be artificially fertilized. The

development is direct and may be readily followed. McIntosh* has published figures of the embryos of this species.

The above includes merely those dates at which genital products have been found mature, and should by no means give the impression that they may not be found in some of the species at other times, both earlier and later than is here indicated. The times when the eggs are normally deposited is certainly liable to considerable variation. *Amphiporus ochraceus*, for example, has on one occasion been found mature as early as January, although the eggs are produced more abundantly four or five months later. In this respect the nemerteans agree with many other invertebrates. In some others, as *Cerebratulus lacteus*, the time during which the eggs can be fertilized lasts for a few weeks at the most, and this period, at New Haven, varies from February to April according to some undetermined peculiarity of the season.

It will be seen that of the common species recorded here nearly all become sexually mature on the southern coast of New England during the summer months. Only one lays its eggs in mid-winter and only two in the very early spring.

W. R. COE.

YALE UNIVERSITY.

THE COLUMBIA MEETING OF THE SOCIETY FOR PLANT MORPHOLOGY AND PHYSIOLOGY.

THE second annual meeting of this Society was held in conjunction with the meetings of the American Society of Naturalists and the Affiliated Societies at Columbia University, December 27 to 30, 1898. On the evening of December 27th a reception was tendered to the members of the Society and visiting botanists by the Torrey Botanical Club of New York, and the Society

* British Annelids; Part I., Nemerteans. Ray Society, 1873.

joined with the Affiliated Societies in the entertainments of Wednesday and Thursday evenings, and in the annual discussion on Thursday afternoon. On Friday a visit was made to the New York Botanical Garden, where the grounds and buildings were shown and explained by the Director, Dr. N. L. Britton. At the business meeting the following officers were elected for the ensuing year: President, Dr. J. M. Macfarlane; Vice-Presidents, Professor G. F. Atkinson and Professor D. P. Penhallow; Secretary, Dr. W. F. Ganong. The following new members were elected: Messrs. F. C. Stewart, C. O. Townsend, F. C. Newcombe, B. D. Halsted, J. B. Pollock, D. S. Johnson, L. M. Underwood, M. B. Waite. The President, Dr. W. G. Farlow, presided over the sessions, at which the following papers were read. Detailed abstracts of these will appear in the February number of the *Botanical Gazette*:

Some Peculiar Morphological Features of Paulownia imperialis: DR. J. W. HARSHBERGER, University of Pennsylvania.—This paper contained a discussion of noteworthy anatomical, ecological and morphological features in this introduced tree, particularly in buds, flowers, fruits and petioles.

The Life-history of Leuchtenbergia principis (abstract): DR. W. F. GANONG, Smith College.—This paper is an attempt at a complete life-history of this rare and highly specialized species of Cactaceae, whose development has hitherto been quite unknown. This contribution is offered as the first of a series of life-histories in this family intended to supply data for a better understanding of phylogeny and of principles of morphology and ecology.

Observations upon Root-tubercles: PROFESSOR B. D. HALSTED, New Jersey Agricultural College.—The author's observations showed that the root tubercles on spring-grown beans of a certain variety are much more abundant than upon autumn-grown plants

of the same variety grown in the same soil. He discusses the reasons for this, finding that of temperature, directly or indirectly, most important, and points out the bearing of his facts upon some others which have puzzled students of the subject.

Further Notes on the Embryology of the Rubiaceae: MR. F. E. LLOYD, Teachers' College.—The author described very peculiar features in the development of the ovule and seed in several members of this family, including the development of as many as eight or ten macrospores in one ovule, very large antipodal cells, and the development of haustoria from the suspensor which absorb the endosperm.

The Inflorescences and Flowers of Polygala polygama: MR. CHARLES H. SHAW, University of Pennsylvania.—In this paper it is pointed out that in this well-known species there are, in addition to the commonly recognized aerial and subterranean cleistogamic blossoms, other green cleistogamic blossoms borne above ground, the characters of which are remarkably intermediate between those of the other two kinds. A full comparison of characters makes this plain.

Observations on some Monocotyledonous Embryo-sacs: MR. R. E. B. MCKENNEY, University of Pennsylvania.—The author described an unusual method of development of the embryo-sac in two species of *Scilla*, and discussed its significance. Incidentally he gave attention to the centrosome question, and was unable to find them in any of the stages studied, thus confirming the work of Mottier and others who doubt their occurrence in the higher plants.

The Structure and Relation of the Crystal Cells in Sensitive Plants: MR. R. E. B. MCKENNEY, University of Pennsylvania.—It is here pointed out that the crystals in cells sheathing the phloem in sensitive plants are insoluble in the ordinary reagents and possibly are made of insoluble silicates. They are also more abundant in the more

sensitive species, and peculiar features are found in the cells containing them. The author thinks it probable they are connected with the transmission of stimuli, the real place and nature of which are not yet known.

The Structure and Parasitism of Aphyllon uniflorum: MISS AMELIA B. SMITH, University of Pennsylvania.—This paper, preliminary in character, described the anatomy of this species and its characters of degeneration due to its parasitism upon a species of *Aster*.

On the Occurrence of Tubers in the Hepaticæ: DR. M. A. HOWE, Columbia University.—The author calls attention to the few known cases of tuber formation in Hepaticæ, and gives a detailed account of the anatomy of the tubers in *Anthoceros phymatodes*, a California species. He interprets these tubers as structures adapted to carry the life of the plant over a season of drought and also as playing a part in vegetative propagation.

Morphology of the Genus Viola: DR. HENRY KRAEMER, Philadelphia College of Pharmacy.—The author has made a detailed microscopical examination of selected characters, particularly in the flower, in several species of the genus *Viola* as a basis for the determination of the phylogeny of those species, and he gives a preliminary classification of those investigated. The work is the continuation of earlier published studies, and is part of a detailed investigation the author expects to make of the entire genus.

Influence of Electricity upon Plants: DR. G. E. STONE, Massachusetts Agricultural College.—The paper contains the results of experiments upon some 20,000 germinating plants to which electrical stimuli were applied by various methods and in different intensities. The author shows, by careful quantitative methods, that, within certain limits, germination is accelerated by the application of electricity; that there is a

latent period and a minimum, optimum and maximum response, and that the relation between perception and stimulus follows Weber's Law.

Notes on the Germination of Spores: DR. C. O. TOWNSEND, Maryland Experiment Station.—The author describes results of experiments made to determine the effect upon their germination of exposure of spores in distilled water to different external conditions. Such exposure, as shown by comparison with control experiments, produced no appreciable effect upon the power of the spores to germinate, except when they were frozen, in which case they failed to germinate at all.

Sensitiveness of certain Parasites to the Acid Juices of the Host Plants: DR. ERWIN F. SMITH, Department of Agriculture.—This paper describes the author's experiments made to determine whether his hypothesis, based upon observation, is correct, that the slow progress of some bacterial diseases of plants is due to the restraining influence of the acid juices of the host plants. By comparison with the results of cultures in solutions of known acidity, he was able to confirm this belief.

Further Observations on the Relations of Turgor to Growth: DR. CARLETON C. CURTIS, Columbia University.—The author described the results of experiments in altering the strength of solutions in which certain fungi were being cultivated, and the effects of the transfer upon growth and turgor force.

Symbiosis and Saprophytism: PROFESSOR D. T. MACDOUGAL, University of Minnesota.—The author points out that the term saprophyte, or holosaprophyte, should be applied only to those forms that obtain organic products without the aid of mycorrhiza, etc., and that hitherto but a single seed-forming plant has been placed in this category. To this, however, the author now adds *Cephalanthera* as result of his researches.

Influence of Inversions of Temperature and Vertical Currents of Air upon the Distribution of Plants: PROFESSOR D. T. MACDOUGAL, University of Minnesota.—As a result of observations made at Flagstaff, Arizona, the author concludes that inversions of temperature through diurnal changes and resultant air currents are more important in affecting plant distribution than has hitherto been supposed. Such changes tend to give minor highlands a more equable temperature than adjoining hills and cañons; to deflect zonal boundaries on great level plains and among minor topographical features, and to favor the growth of moisture-loving species along the margins of table-lands bordering on valleys.

Peculiarities of the Distribution of Marine Algæ in North America: Presidential Address, DR. W. G. FARLOW, Harvard University.—This address, illustrated by maps, discussed the distribution of North American Marine Algæ with particular reference to the factors, temperature, direction of ocean currents, character of coasts, etc., determining it. It is expected that it will later be published in full.

Some Appliances for the Elementary Study of Plant Physiology: DR. W. F. GANONG, Smith College.—The author exhibited and described some simple and inexpensive appliances invented by him for illustrating some of the more fundamental physiological facts and phenomena of plants. These included a temperature stage, a clinostat, a self-recording auxanometer, an osmometer, a way of demonstrating the exchange of gases in respiration, a germination box, a useful way of preparing plants for transpiration weighings, and an efficient way of graduating growing roots, etc.

Some Notes on the Reproduction and Development of Nereocystis: PROFESSOR CONWAY MACMILLAN, University of Minnesota.—The author described his observations upon the life-history of this species, giving par-

ticular attention to the ecological aspects of the subject.

The Formation and Structure of the Dissepiment in Porotheium: DR. E. A. BURT, Middlebury College.—The author traced the development of the fructifications of *Porotheium fimbriatum* from their origin to the tube stage, and contrasted the structure of the dissepiment in different cases.

Gelatin Culture Media: DR. ERWIN F. SMITH, Department of Agriculture.—The author spoke of the value of gelatin culture-media and pointed out certain precautions to be observed in its use, particularly with reference to the fixing of the melting-point, the occurrence in it of sugar and of acid salts, and how the influence of these may be overcome.

Notes on the Relative Infrequency of Fungi upon the Trans-Missouri Plains and the Adjacent Foothills of the Rocky Mountain Region: DR. CHARLES E. BESSEY, University of Nebraska.—An abstract of this paper, given by Dr. Erwin F. Smith, showed that the author had noted, in the course of his fourteen years' collecting of fungi in the region named, that the number of species of fungi is large while the number of individuals is small, exactly the opposite of what is true in the same region for the flowering plants.

Different Types of Plant Diseases Due to a Common Rhizoctonia: MESSRS. B. M. DUGGAR, Cornell University, and F. C. STEWART, New York Experiment Station.—The studies of the authors have shown that a stem rot of the carnation is due to a fungus agreeing precisely with *Rhizoctonia Betae*, which has caused a serious rot of sugar beets in New York during the past year. The fungus is described and suggestions given for its treatment.

The Stem Rot Diseases of the Carnation: MR. F. C. STEWART, New York Experiment Station.—The author points out that two distinct diseases of carnations have been confused. One is that described by him-

self and Mr. Duggar (in the preceding paper), and another is due to a *Fusarium*. The differences in the effects of the two are described.

W. F. GANONG,
Secretary.

SMITH COLLEGE, NORTHAMPTON, MASS.

ELEVENTH ANNUAL MEETING OF THE AMERICAN FOLK-LORE SOCIETY.

THIS meeting, held in connection with the affiliated societies, at Columbia College, on December 28th and 29th, was indicative of progress. According to the report of the Council the number of members had remained about constant, amounting to about five hundred. The report of the Treasurer showed that annual receipts and expenses were about equal. As the next volume of the series of *Memoirs of the Society* was announced a second part of 'Current Superstitions,' by Mrs. Fanny D. Bergen, including those relating to animals and plants; the first part of this work forms the fourth volume of the *Memoirs*, of which six volumes have now appeared.

As officers for 1899 were elected Professor C. L. Edwards, of the University of Cincinnati, President; Miss Alice C. Fletcher, Washington, First Vice-President; Mr. C. F. Lummis, Los Angeles, Cal., Second Vice-President. The Secretary and Treasurer hold over.

A committee was appointed to take into consideration the subject of the collection and record of folk-music, and to propose plans for the more adequate collection of negro folk-music in America.

The address of the retiring President, Dr. Henry Wood, of Johns Hopkins University, dealt with 'Folk-lore and metaphor in literary style.' The object of the speaker was to exhibit the dependence of the consciously artistic metaphor of literature to the traditional metaphor which forms its underlying basis.

Among papers read may be mentioned observations on 'The study of ethics among the lower races,' contributed by Dr. Washington Matthews. The writer considered the study of myths and traditions to be the safest guide in this field, which as yet has scarcely been traversed; but in the use of such material it is necessary to proceed with caution and employ the critical methods of modern science. If the gods of the tribe are considered as approving any action, or if the author of the tale appears to look for the approbation of his audience, it may be concluded that the act is regarded as possessing a moral quality, however, repulsive it may appear according to our ideas. That there exists a strong sense of the morality of conduct is obvious from the security of life; thus the Navahoes live in entire peace without courts or punishments. With this people there exists no penalty for theft; the thief is merely required to restore the stolen property. According to the myths incest is presumed to be confined to witches and cannibals. Truthfulness is not inculcated as a duty, yet Dr. Matthews had found the veracity of the people to be about equal to that of the whites. Expectation of reward in a future life does not exist. Conscience forms an effective power. The tales attest the frequency of active benevolence.

Mr. W. W. Newell offered some observations on the relation, in sun-myths, of the visual impression to the symbolic conception. He pointed out the antiquity and universality of the radiant disk as a solar symbol, arguing that the effect on the sight must have been constant. He considered the variety of the myths to be the result of causal explanations, the orb being considered as an object somehow to be got through the sky, treating of the Indian myths regarding the sun-bearer, who is often confounded with the orb he carries. Dr. Boas observed that among the Kootenay, for

example, the sun is regarded as an animal; but perhaps it was conceived that the light emanated from a certain part of the creature, just as in the numerous myths where the luminous disk is regarded as part of the decoration of a sun-bearer.

Mr. A. L. Kroeber presented a collection of animal tales of Eskimo, in part as made by himself from Smith Sound Eskimo. In these tales there is a contrast between Indian and Eskimo conceptions. Among Indians animals play an important part and are conceived as human in character. With Eskimo, on the contrary, animal stories are few; they belong chiefly to two classes, the first describing a marriage between a human being and an animal, the second answering to European beast fables. The paucity and brevity of the latter differentiate them from the Indian narratives. Dr. Kroeber subjoined a list of recorded Eskimo animal tales.

Dr. Livingston Farrand read a paper on the 'Mythology of the Chilcotin,' in which the relations of the tales of this people with those of their neighbors was discussed, with a view to obtaining a criterion in regard to the vexed question of diffusion or independent origination of similar myths. Dr. Farrand concluded that identity of theme was of minor importance as proof of borrowing, while agreement in details, among races contiguous or in communication, could be explained only on the hypothesis of diffusion.

Notes on American Indian names of white men and women were presented by Dr. A. F. Chamberlain, of Clark University, and 'Contributions toward a bibliography of folk-lore relating to women,' by Mrs. Isabel Cushman Chamberlain.

Miss Cornelia Horsford communicated information in regard to traditions connected with an apparent footprint on a rock of Shelter Island.

Other papers were offered by Dr. Robert

Bell, Professor Thomas Wilson and Mrs. F. D. Bergen. Demonstrations were made of phonographic records of Indian song.

W. W. NEWELL.

SCIENTIFIC BOOKS.

Kalender für Geologen, Paläontologen und Mineralogen. Herausgegeben von DR. K. KEILHACK. 2d annual edition, 1899, with a portrait of Professor C. W. v. Gümbel. Leipzig, 1899, published by Max Weg. Pp. 288, with blank pages for notes. Price, 3 Marks.

A handbook for geologists comparable to the numerous pocket aids, edited for the use of engineers, has never been issued. Dr. Keilhack began in 1898 the work, which is here described, in such a way as to fill some of the needs for such a book of reference. The list of contents of the present edition will serve as a sufficient notice of the booklet. The work gives a list of the official geological surveys of all countries, including the American States, with their officers, the maps published, the prices of the maps and information concerning the other publications of the surveys. Where possible, the annual money allotment is stated. Secondly, a list of the professors and instructors in geology, paleontology and mineralogy in the colleges and high schools of the world, alphabetically arranged by towns. It is to be noted that the American high schools do not rank as 'high schools' of European grade. Hence American high-school teachers are not here named. Thirdly, a list of geological, paleontological and mineralogical societies, with a brief account of their publications and membership. Fourth, the addresses of geologists, etc., of Germany, Holland, Australia, Switzerland and Hungary. Fifth, the public and private geological, mineral and paleontological collections of the countries just named. Sixth, the subdivisions of the greater geological formations in Europe. Seventh, a tabular view of the massive rocks, after Zirkel. Eighth, the characteristics of common minerals, giving their system of crystallization, specific gravity, hardness, chemical composition, streak color and the crystallographic position of their leaf cleavage. Ninth, a comparative table of the

crystallographic systems of Naumann, Weiss and Miller, with formulas for converting the symbols of one system into those of another. Tenth, atomic weights of the elements. Eleventh, an essay on the history of the names of geologic formations, by J. Walther. Twelfth, rules for the termination of proper names in scientific literature. Thirteenth, a brief notice of the advance of geology for the year. Fourteenth, list of geologists who have died since October 1, 1897. Fifteenth, table of the commonly-used measures of length. Sixteenth, isogonic chart of Europe for 1899. Seventeenth, lists of periodicals now published. Eighteenth, a list of geological, paleontological and mineralogical literature for 1898. (Very incomplete, particularly as regards America, and frequently useless because name of periodical is not given.) Following is a chart of map scales, a daily calendar, a few blank pages for accounts, and blank and cross-section pages for geologic notes. Then come 26 pages of advertisements of German materials for use in geologic investigation and teaching. Worthy of notice among these advertisements is Professor Dames' Geological Globe, of 34 cm. diameter, which will be useful in every geological laboratory.

The writer found the first edition of this book an invaluable *vade mecum* in a European trip. At home the book serves as a valuable check-list for the sending of separates, for information concerning geologic maps, and while it is not particularly adapted to the American geologist it is a welcome addition to the reference books one keeps about his desk. A handbook for the field geologist has yet to be written. Just what such a book should contain is probably difficult to ascertain.

J. B. WOODWORTH.

The Chinch Bug. By F. M. WEBSTER. Bull. No. 15, N. S., Div. of Entomology, U. S. Dept. of Agriculture. [November] 1898. Pp. 82.

This excellent bulletin deals with a subject of perennial interest to farmers and entomologists; and although the literature of the chinch bug is already large, Professor Webster has found plenty of new and interesting things to say about it. In the most interesting and convincing way, he shows how the insect may have origi-

nated in Central America, and spread northward in three columns, one along the Pacific coast, the second over the prairie region east of the Rocky Mountains, and the third along the shores of the Gulf of Mexico and Atlantic ocean. On p. 72 a map is given illustrating these migrations. The Pacific column appears to be weak, and is little known, but the other two are strong in numbers. In the course of these migrations the insects have become modified, and it is clearly shown that the Atlantic and prairie hordes differ both in habits and structure. Just at this point the present writer is inclined to disagree with Professor Webster's opinion, that there is only one species of *Blissus* in North America. There are reasons for believing that we have at least three species, and Montandon (Ann. Soc. Ent. Belg., XXXVII., 1893) has described as new *B. hirtus* from North America, and *B. pulchellus* from Central and South America. Unfortunately, I have not access to these descriptions, but from the data furnished by Professor Webster we may separate the following:

1. Form of Central America and the West Indies: Macropterous, perhaps of larger average size than the North American type. This may be Montandon's *pulchellus*.

2. Form of the prairie region of North America, probably also of California: Macropterous, more slender and less hairy than the coast insect. This is doubtless Le Baron's *Rhy-parochromus devastator*, and will be called *Blissus devastator* (Le Baron). This insect occurs in small numbers, and is evidently native, along the eastern base of the Rocky Mountains, in Colorado and New Mexico. Like the Colorado potato beetle, it has become destructive when, moving eastwards, it found the cultivated fields of the central States. Professor Webster shows that it is very destructive to wheat and corn, but rarely attacks timothy. It has two annual broods.

3. Form of the coast region and northeastern States. This is doubtless the true *Blissus leucopterus*, Say. It has both brachypterous and macropterous forms, and is somewhat broader and decidedly more hairy than *devastator*. It depredates almost exclusively upon timothy grass and is single-brooded.

4. Another brachypterous sea-coast form, quite hairy and with colorational peculiarities, has been found at Lake Worth, Florida, and Fortress Monroe, Virginia, as recorded by Dr. L. O. Howard. I do not know whether this is Montandon's *hirtus*.

It seems to the writer that the probability of there being at least three species among the above insects is great enough to deserve serious consideration. If those who have the material will boil up a number of each in caustic potash, and examine the structural characters under the microscope by transmitted light, it is probable that new differences will appear, especially in the male genitalia. If it can be established that the seriously destructive insect of recent years is *B. devastator*, and not *B. leucopterus* at all, and that the former is still migrating eastwards, the fact will not only be of scientific but of economic importance.*

T. D. A. COCKERELL.

MESILLA PARK, N. M.,

November 24, 1898.

Postscript, December 9th. Dr. L. O. Howard writes me: "The eastern form [*leucopterus*] injures many plants, including rice. That it is apparently more resistant to fungus attack, however, was shown in a curious way last summer, when it damaged grass lawns in the heart of the City of Brooklyn in an abnormally wet season and in spite of repeated drenchings from the sprinkler hose."

A Manual of Chemical Analysis, Qualitative and Quantitative. By G. S. NEWTH, Demonstrator in the Royal College of Science, London. New York, Longmans, Green & Co. 1898. Pp. vii + 462.

This book is a decided departure from the usual manuals of qualitative and quantitative analysis. The author has endeavored, and with much success, to present a book which will teach the theoretical as well as the practical side of analytical chemistry and to avoid as far as possible teaching mechanical opera-

tions. He has divided the volume into two parts: Book I., of 136 pages, treating of qualitative analysis; and Book II., giving the methods of gravimetric and volumetric analysis of inorganic substances, including the analysis of the more simple gases, of the determination of carbon, hydrogen, nitrogen, sulphur and the halogens in organic compounds, and of some simple physico-chemical experiments.

The subject of qualitative analysis is treated in a broad way, and the student who follows the text conscientiously will obtain a wide knowledge of general chemistry. The author first shows how the subject can be classified according to the reaction with the group reagents, and then considers the properties of the separate elements. The general chemistry of each of the more common elements is discussed, giving only those properties which are useful for the separation and identification of the elements in analysis, and after having considered the properties of a group of elements there is given a summary of the particular properties which are utilized in separating the members of the group. The general reactions taking place, the properties of the substances and their compounds are so clearly stated and the subject is so logically developed that the qualitative separation of the substances follows naturally, and the quantitative separation is but a step further. This is particularly true of that portion of the book which treats of the oxidation and reduction of iron, chromium and manganese compounds. The reactions of chromium and the separation in the presence of phosphates, which are often difficult points for the student to grasp, are fully and satisfactorily explained. The separation of iron, chromium and aluminium is based upon the oxidation of chromium to chromic acid by sodium peroxide and the solubility of aluminium hydroxide in sodium hydroxide, and should commend itself more favorably than the usual methods of separation for this group. Another point which deserves special mention is the fact that after each group follows an appendix in which the properties of the rarer elements of that group are considered. The concluding chapter of the portion of the book devoted to qualitative analysis is full of sound advice on the in-

* On p. 50 Professor Webster notes that few chinch bugs died from the parasitic fungus in the timothy meadows of northern Ohio. These were the *B. leucopterus*, which, coming from a relatively damp region, may have acquired greater powers of resistance to the fungus attack than *B. devastator*, from the dry prairies of the far West.

telligent interpretation of results and on the cultivation and development of habits of observation.

There are some points on which the author has either not laid enough stress or where a better method of procedure might have been offered. The difficulties produced by the simultaneous presence of chromium and zinc are not mentioned, and it would have been much better to have given here, as an alternative method, the barium carbonate process, not only for the separation of zinc from chromium, but also for the separation in the presence of phosphates. Again the Fresenius method for separating small amounts of barium, calcium and strontium would prove more accurate than the separation by means of potassium chromate and acetic acid. The preliminary tests and operations necessary to get a substance into solution are systematically treated, but no mention is made of fusion with acid potassium sulphate. There are two portions of Book I. which reflect on the intelligence of the student, and the book would have been much better without them, viz.: the tables at the end of each chapter giving an outline of the process; and Chapter I., which treats of filtration, solution, evaporation, fusion, precipitation, ignition and neutralization, processes, which properly belong to experimental general chemistry. If the student had not already been over the ground here given he would not be fitted to begin qualitative analysis.

There will undoubtedly be a difference of opinion concerning that portion of the book devoted to quantitative analysis, particularly in regard to the selection of the gravimetric analyses and to the details necessary to carry them out. After the preliminary operations of weighing and preparation of pure salts the gravimetric determination of the more common metals and acids is studied in detail, and then follows a chapter on the determination of the constituents of silver coin, solder, German silver, bronze, dolomite, zinc blende and an insoluble silicate containing the alkalies. The well known typical methods of volumetric analysis are given. By excluding many descriptive details and by conciseness and clearness of expression the author has condensed a

great deal into this portion of the book, which, if followed under the guidance of an instructor, should give any student a good general knowledge of quantitative methods.

Following the gravimetric and volumetric methods, the physico-chemical methods for the determination of specific gravity, boiling point, melting point and vapor density are given. The author could very advantageously, and should, have included here the determination of molecular weights by boiling- or freezing-point methods, and then followed it by a brief *résumé* of the more recent applications of theoretical chemistry to quantitative analysis. Such a chapter would have been in harmony with the rest of the book and would have increased its value greatly.

In his preface the author says, "I have carefully avoided the use of those symbolic abbreviated expressions, such as H_2O (oxalic acid), H_2T (tartaric acid)," etc., and nevertheless he uses the formula 'Cy' instead of CN, offering as an excuse that 'Cy' is a recognized and convenient symbol for the radical (CN) cyanogen. He is further inconsistent in the uses of the doubled formulæ for the hydroxides of iron, chromium and aluminium, as $Fe_2(OH)_2$, etc., while perhaps in the same equation he will use the single formula for the chloride $FeCl_3$.

The author it seems takes unusual precautions in igniting filter papers apart from the main portion of the precipitate. This tedious operation might have been avoided in many cases by the use of the Gooch crucible, which receives no mention.

As a whole the book is remarkably free from objectionable points, and is a distinct advance in the scientific treatment of analytical chemistry.

HENRY FAY.

RECENT PUBLICATIONS OF THE U. S. GEOLOGICAL SURVEY.

THE following bulletins have been recently issued by the U. S. Geological Survey:

Bulletin 89. 'Some Lava Flows of the Western Slope of the Sierra Nevada, California,' F. L. Ransome.

The author describes a series of lava sheets, one of which forms the celebrated Table Moun-

tain, in Tuolumne county, California, and which has been usually described as basalt. The rocks are intermediate between the trachytes and andesites and are specially named 'latites.' Inasmuch as six other names have already been proposed for rocks of this general character, the author had a magnificent opportunity to resist the temptation to make a new one.

Bulletin 149. 'Bibliography and Index of North American Geology, Paleontology, Petrology and Mineralogy for 1896,' F. B. Weeks.

This bulletin continues the excellent series already represented by Nos. 127, 130, 135 and 146.

Bulletin 150. 'The Educational Series of Rock Specimens, collected and distributed by the U. S. Geological Survey,' J. S. Diller.

The petrography of the series is set forth by Mr. Diller and others. The work will be more fully reviewed elsewhere in SCIENCE.

Bulletin 151. 'The Lower Cretaceous *Gryphæas* of the Texas Region,' R. T. Hill and T. W. Vaughan.

This Bulletin has been reviewed in SCIENCE for January 20, 1899 (p. 110), by Professor Frederic W. Simonds.

Bulletin 152. 'Catalogue of the Cretaceous Plants of North America,' F. H. Knowlton.

Bulletin 153. 'Bibliographic Index of North American Carboniferous Invertebrates,' Stuart Weller.

Bulletin 154. 'A Gazetteer of Kansas,' Henry Gannett.

Bulletin 155. 'Earthquakes in California in 1896 and 1897,' Charles D. Perrine.

Bulletin 156. 'Bibliography and Index of North American Geology, Paleontology, Petrology and Mineralogy for 1897,' Fred. B. Weeks.

The titles of Nos. 152-156 inclusive indicate the contents.

THE Macmillan Company announce the early publication of the second part of Dr. Davenport's 'Experimental Morphology, which treats of the effect of chemical and physical agents upon growth. They also announce 'A History of Physics; in its Elementary Branches Including the Evolution of Physical Labora-

tories' which has just been completed by Florian Cajori, Ph.D., professor of physics in Colorado College and author of 'A History of Mathematics.'

THE Open Court Publishing Company have now in press the 'Principles of Bacteriology,' by Professor Ferdinand Hueppe, of the University of Prague, translated by Professor E. O. Jordan, of the University of Chicago.

BOOKS RECEIVED.

Hand-book of Metallurgy. CARL SCHNABEL. Translated by HENRY LEWIS. London and New York, The Macmillan Company. 1898. Vol. I., pp. xvi + 876. Vol. II., pp. xiv + 732. \$10.00.

A Guide to the Study of the Geological Collections of the New York State Museum. FREDERICK J. H. MERRILL. Albany, University of the State of New York. 1898. Pp. 207 + 65 plates. 40 cents.

Earthenware of the New York Aborigines. WILLIAM M. BEAUCHAMP. Albany, University of the State of New York. 1898. Pp. 76 + 142. 245 illustrations. 25 cents.

The Last Link, our present Knowledge of the Descent of Man. ERNEST HAECKEL. London, Adam and Charles Black; New York, The Macmillan Company. 1898. Pp. 156. \$1.00

The Principles of Stratigraphical Geology. J. E. MARR. Cambridge, The University Press; New York, The Macmillan Co. 1898. Pp. 304. \$1.60.

Society for the Promotion of Engineering Education Sixth Annual Meeting, Vol. VI. Edited by T. C. MENDENHALL, J. B. JOHNSON and A. KINGSBURY. Published by the Society. 1898. Pp. xxvii + 324.

Traité de zoologie concrète. YVES DELAGE and EDUARD HÉROUARD. Vol. VIII., Les procordes. Paris, Schleicher Frères. 1898. Pp. vii + 379.

SCIENTIFIC JOURNALS AND ARTICLES.

THE New England Botanical Club has established a journal to encourage the study of the local flora. It has been given the name *Rhodora* and will be published monthly at 740 Exchange Building, Boston. The editor-in-chief is Mr. B. L. Robinson, with Messrs. F. S. Collins, M. L. Fernald and Hollis Webster as associate editors. The first number, which contain twenty pages and two plates, opens with an editorial announcement, followed by a number of inter-

esting articles and notes on the flora of New England.

THE initial number of the *Bulletin* of the Cooper Ornithological Club of California contains a biographical sketch, with portrait of Dr. James C. Cooper, after whom the Club is named. Among the other contributions is one on the 'Nesting of the Fulvous Tree-Duck,' showing that this species frequently deposits its eggs in the nests of other species, and also that it is either more prolific than any other duck, or that several females lay in one nest, 28 to 32 eggs being found on several occasions.

THE publication of the *Osprey* for December, 1898, brings this magazine down to date, and we are promised that there will be no delays in the future. The leading article, by E. W. Nelson, is devoted to a 'Morning with the birds on Mount Orizaba,' and there is an interesting account of the Sea-birds off the New England coast by H. K. Job. A fine plate of blue jays, by Fuertes, closes the number, but this, like the other illustrations, has suffered in the printing.

THE *Bulletin* of the U. S. Fish Commission for 1897, Vol. XVII. of the series, is mainly occupied with the papers read at the National Fisheries Congress, held at Tampa, Fla., in January, 1898. Among the other papers are accounts of the Salmon Investigation of the Columbia River Basin in 1896, and of the Salmon Fishery of Penobscot River and Bay in 1895 and 1896.

THE February number of *The Open Court* contains an article by Professor R. M. Wenley, of the University of Michigan, on the Gifford Lectureships, established with an endowment of \$400,000, by the late Lord Gifford, in the four Scottish Universities, for the purpose of encouraging research in natural theology. In his will Lord Gifford stated that he wished the lecturers to treat their subject strictly as a natural science—as astronomy or chemistry is treated. The present incumbents of the lectureships are: At St. Andrews, the Hebrew scholar, Professor Wellhausen, of Marburg; at Glasgow, the physiologist, Professor Foster, of Cambridge; at Aberdeen and Edinburgh, Professors Royce and James, respectively, professors of philosophy and psychology at Harvard University.

SOCIETIES AND ACADEMIES.

WISCONSIN ACADEMY OF SCIENCES, ARTS AND LETTERS.

THE 29th annual meeting of the Academy was held on December 27th and 28th last, at Milwaukee, with the President, Professor C. Dwight Marsh, of Ripon College, in the chair.

Professor E. A. Birge, Director of the State Geological and Natural History Survey, made a report on the general progress of the Survey. Dr. E. R. Buckley followed with a special report on Wisconsin building stones and Professor D. P. Nicholson on lake investigations. Professor C. R. Van Hise and others urged that the recommendation of the Academy for the continuation and extension of the Survey be presented formally to the Legislature. A committee was appointed for this purpose.

It was voted as the sense of the meeting that the library of the Academy should be put in the custody of the State Historical Society when the latter should remove its own library to the new building provided for it by the State. The library of the Academy has become important, especially in the line of transactions of foreign societies, and it is expected that suitable rooms will be available for it in the new building.

Mr. Ernest Bruncken, Secretary of the State Forestry Commission, reported on the legislation which the Commission will endeavor to gain the present winter. Three lines of effort will be recommended: (1) to establish a complete corps of fire wardens and efficient supervision thereof; (2) to study conditions of forest growth, both in the forest itself and at experiment stations; (3) to educate public opinion.

The program of the meeting contained, together with other papers, the following of a scientific nature:

'Lake temperatures.' E. A. Birge.

'Contributions from the histological laboratory of the University of Wisconsin.' W. S. Miller.

'Further facts in relation to the succession-period of generations.' C. H. Chandler.

'Lantern Projections of Three Dimensional Curves and Surfaces,' and 'Theoretical Investigation on the Motion of Ground Waters—III, Mutual Interference of two or more Artesian Wells.' C. S. Slichter.

'The Maximum Gravitational Attraction at the Pole of a Spheroid.' E. F. Chandler.

'Combinations of Pythagorean Triangles as giving Exercises in Computation.' T. H. Safford.

'A Study of the Class of Electric and Magnetic Oscillations known as Aphotic.' J. E. Davies.

'Some Facts in Regard to the Development of Epischura.' C. Dwight Marsh.

'The Block System of Arranging Insect Collections.' Harriet B. Merrill.

'Spines of Trilobites and their Significance.' G. L. Collie.

'The Crystallography of a Gold Telluride from Cripple Creek,' and 'The Crystallography of a new Reduction Product of Terpene.' W. H. Hobbs.

'The Volume Relations of Original and Secondary Minerals in Rocks.' C. R. Van Hise.

'The Electrical Properties of Non-Aqueous Solutions.' A. T. Lincoln.

'The Effects of the Presence of pure Metals upon Plants.' Louis Kahlenberg and E. B. Copeland.

'Revision of the Pronouns, with Special Consideration of Relatives and Relative Clauses.' E. T. Owen.

The number of new members elected was 14. The active members of the Academy now number 200.

A. S. FLINT,
Secretary.

MADISON, WIS.

THE OHIO ACADEMY OF SCIENCE.

THE Ohio Academy of Science held its eighth annual meeting at Columbus, Ohio, on December 29 and 30, 1898, in Orton and Zoological Halls of the Ohio State University. Eighteen new members were elected. Hon. Emerson McMillen, a life member of the society, donated the sum of \$250 to be applied as the trustees of the Society may see fit, for the encouragement of investigation. Officers were elected for the coming year as follows: President, Professor G. Frederick Wright, of Oberlin; Vice-Presidents, Chas E. Albright, of Columbus, and A. D. Selby, of Wooster; Secretary, E. L. Mosely, of Sandusky; Treasurer, Professor Herbert Os-

born, of Columbus; Executive Committee, E. E. Masterman and G. H. Holferty; Publication Committee, F. M. Webster, of Wooster.

Professor W. G. Tight, of Dennison University, delivered the retiring President's address on the subject 'Geographical Teaching and the Geography of Ohio.'

The following papers were read: 'A Deep Pre-Glacial Channel in Western Ohio and Eastern Indiana,' by J. A. Bownocker; 'The Division of the Macrospore Nucleus of *Erythronium*,' 'Two Interesting Filamentous Bacteria from Columbus' and 'Nutation of the Cultivated Sunflower,' by John H. Schaffner; 'Some Recently Discovered Pre-Glacial Cols in Ohio,' 'A Galenite Geode from Muskingum Co.' and 'A Pocket Instrument for the Approximate Determination of Distance by Triangulation,' by W. G. Tight; 'Some Observations on *Unio subovatus*,' by F. L. Landacre; 'Some Observations on the Topography of Athens and Vicinity,' by H. E. Chapin and C. H. Stearns; 'The Laboratory and the Field—Their Relative Importance,' by H. E. Chapin; 'A Contribution to the Knowledge of the Faunistic Entomology of Ohio,' 'Some Notes on the Grape Cane Gall Maker, *Ampelogypter sesostris*,' and 'Some Apparent Relations of Ants to Peach aphids, *A. persicæ-niger*,' by F. M. Webster; 'Some Observations on the Pre-Glacial Drainage of Wayne and Associate Counties,' by J. H. Todd; 'A Plea for Science Teaching in the Public Schools,' by Miss Mary E. Law; 'Notes on Ecological Plant Geography of Summit, Wayne and Medina Counties' and 'Field Notes,' by A. D. Selby; 'Some Sources of the Ohio Flora,' by A. D. Selby and J. W. T. Duvel; 'Notes on Fasciation,' 'Some Abnormal Plant Specimens' and 'Further Studies in Embryology,' by Miss L. C. Riddle; 'Distribution of the Microscopic Fungi,' 'Reliability of Spore Measurements of the Fleshy Fungi,' 'The Illinois Biological Station' and 'Occurrence of Phalli near Cleveland,' by H. C. Beardsley; 'Climate of the Philippine Islands,' 'Life in the Philippines' and 'Some Rare Ohio Plants,' by E. L. Mosely; 'Development of the Microsporangium of *Hemerocallis fulva*,' by E. L. Fullmer; 'Lichens New to Ohio,' 'List of Phænogams New to Ohio or Rare in and New to Coun-

ties in Northern Ohio' and 'Lists of Erysipheæ and Uredineæ of Cuyahoga and other Counties of Northern Ohio,' by Edo Claassen; 'Studies of *Ustilago Reiliana*,' by W. A. and K. F. Kellerman; 'Plants New to the Ohio Flora' and 'Observations on the Ohio Flora,' by W. A. Kellerman; 'A Descriptive List of the Fishes of the Big Jelloway Creek System,' by J. B. Parker, E. B. Williamson and R. C. Osburn; 'Additional Notes on Franklin County Fishes,' by E. B. Williamson and R. C. Osburn; 'Additional Notes on the Crayfish of Ohio,' by E. B. Williamson; 'Additions to the Ohio List of Dragonflies,' 'Additions to the Ohio List of Butterflies' and 'Twenty-five Species of Syrphidæ not Previously Reported for Ohio,' by J. S. Hine; 'Remarks on the Hemipterous Fauna of Ohio, with a Preliminary Record of Species,' by Herbert Osborn; 'A Bat New to Ohio,' by J. F. Cunningham; 'A Female of the Purslain Sawfly, *Schizocerus* Sp?, with a Male Antenna,' by C. W. Mally; 'The Waste or Refuse in Fruit and Nuts,' by W. R. Lazenby; 'On the Occurrence of the Black-Capped Petrel, *Æstrelate hasitata*, at Cincinnati, Ohio,' by Joshua Lindahl.

R. C. OSBURN.

ENTOMOLOGICAL SOCIETY OF WASHINGTON.

January 12, 1899.—Under the head of exhibition of specimens Mr. Schwarz showed a true queen of an undescribed species of *Termes* which had been found by Mr. H. G. Hubbard in the Madera Cañon of the Santa Rita Mountains, Arizona. This is the first true Termite queen which has been found in North America.

Mr. Heidemann exhibited a species of the genus *Hoplinus* found by Mr. Schwarz in southern Arizona (Catalina Mountains). This is a curious species thickly covered with spines, on account of which Mr. Ashmead suggested that, as the vegetation of that region is spiny, the presence of this armatured bug indicated a case of protective resemblance. A long discussion ensued on the subject of mimicry and protective resemblance among insects, participated in by Messrs. Gill, Ashmead, Judd and Howard.

Dr. Dyar presented some notes on the phylogeny of the Lasiocampidæ. Apropos of Mr. Tutt's recent article on the subject he had gone

over the group and established a genealogical tree based principally upon the larval characters and the wing venation. The discussion of this paper took the form of a continuation of the subject of protective resemblance suggested by Dr. Dyar's remarks about the larvæ of this group of Lepidoptera, especially in relation to the sub-lateral structures developed as a means of eliminating the shadow cast by the caterpillars, consisting in one group of larvæ of a longitudinal white line and in others of lateral processes. Further discussion, by Messrs. Gill, Ashmead and Dyar, considered the larval characters of the Lepidoptera, Dr. Dyar stating that the most generalized larva is tuberculate, tubercles being lost and hairs being developed in the process of specialization.

Mr. Schwarz read a paper by Mr. H. G. Hubbard on the luminosity of a larviform Coleopter supposed to be the female of *Mastinocerus*, and supplemented Mr. Hubbard's note by general remarks on the females of Lampyrid beetles. Discussion followed, relating especially to the question as to whether luminosity in the Lampyridæ is a specialized condition, Dr. Gill taking the stand that from its more or less isolated occurrence in several groups of this family it is more likely to have been an original condition which has been lost perhaps by a majority of species in the process of specialization, calling attention to the analogy between this phenomenon in the Lampyridæ and Elateridæ to the phenomenon of electricity in the fishes, occurring as it does here and there in several groups. Mr. Schwarz stated that the relationship between the luminous Lampyridæ and the Elateridæ was closer than perhaps has hitherto been suspected and called attention to the fact that the larviform female of *Phengodes* was originally described by Le Conte as an Elaterid. Mr. Howard considered that from the fact that the species which lack this physiological quality correspond to the normal coleopterous type and that since the larviform females possess what may be termed highly degradational characteristics comparable to those acquired by a life of parasitism, for example, the luminosity should probably be considered a high specialization of comparatively recent origin.

The final paper of the evening was presented

by Mr. Howard who exhibited a series of Australian insects of economic importance and made a brief statement of the present condition of economic entomology in the Australian colonies. He called attention to the fact that the introduction of agriculture on a large scale in this comparatively new region had resulted in the attacks of many native species upon cultivated crops. The specimens shown had been sent him by Mr. W. W. Froggatt, the Entomologist of the Department of Agriculture of Sydney, New South Wales, and included a number of species of great economic importance. He noted the curious habit of the apple root-borer (*Leptops hopei*) in laying its eggs in the folded leaf of the apple, the newly hatched larvæ dropping to the ground and entering the roots; the damage done by the orange bug (*Oncosalis sulciventris*), the vine moth (*Agarista glycina*) and a number of other species, showing among other things that the so-called climbing cut-worm named by Mr. Froggatt *Plusia verticerrata* is apparently nothing but our North American *Prodenia lineatella*. In briefly discussing this paper Mr. Schwarz drew a comparison between the large number of native species which, by a change of habit, have attacked cultivated crops in Australia and the extremely small number which have similarly changed their habits in our own Northwest. He recalled no native species in Washington and Oregon which have become crop pests.

L. O. HOWARD,
Secretary.

THE ACADEMY OF NATURAL SCIENCES OF
PHILADELPHIA.

December 20, 1898. PROFESSOR ANGELO HEILPRIN made a communication on the physical geography and geology of the Klondike region, with incidents of a summer trip to Dawson City. The general features of the country traversed were described and profusely illustrated by lantern views.

A paper entitled 'Synopsis of the United States species of the Hymenopterous genus *Centris* Fabricius,' by William J. Fox, was presented for publication.

January 10, 1899. PROFESSOR H. A. PILSBRY described a New Mexican Helicoid land shell

received from Professor Cockerell. A dissection showed that the form agreed with the Epi-phragmophora in the structure of the generative organs and the form of the kidney, while the shell closely resembles *Polygyra*. The new genus thus defined was named *Ashmunella* in recognition of the services of the collector.

DR. WILLIAM H. DALL referred to the discussion at the recent meeting of the Geological Society of America of the authenticity of the Calveras skull, and described the specimen as examined by him immediately after it came into the possession of Professor Whitney, of the Geological Survey of California. The speaker believed that so far no sufficient reason had been adduced for doubting the genuine character of the skull and its original situs below the lava, though the question of the coexistence of man and the extinct mammals whose remains have been found in the same gravels is entirely distinct and may reasonably be left open.

The subject was discussed by Mr. Lewis Woolman, who also referred to recent ineffectual attempts to find implements of human manufacture in the Trenton gravels.

A paper entitled 'New and Interesting Species in the Isaac Lea Collection of Eocene Mollusca,' by Charles W. Johnson, was presented for publication.

January 17, 1899. MR. CHARLES S. BOYER read a paper on the general study of diatoms and on the characters of the forms found in the neighborhood of the mouth of Pensauken creek and elsewhere near Philadelphia.

MR. LOUIS WOOLMAN dwelt on the geological position and characters of the deposits containing the forms enumerated by Mr. Boyer and exhibited microscopic preparations in illustration of his remarks.

PROFESSOR ANGELO HEILPRIN, alluding to Dr. Dall's communication on the Calveras skull, recounted the arguments for and against its authenticity recently presented to the Geological Society of America. He regarded the present evidence of the miners as worthless. He had calculated the age of the cañon to be quite consistent with the existence of Indians contemporaneous with the deposit of the skull, although he agrees with Dr. Dall that, with the

evidence now in our possession, the question could not be definitely settled.

MR. P. P. CALVERT referred to a recently published paper on the structure of the gizzard of dragon flies and recounted the results of the recorded observations. He had been able to dissect out the gizzard, in good condition for study, from dried specimens, one having been obtained from a fly captured in Burmah in 1889. The ridges, which form a prominent feature of the organ, do not seem to be smoothed away by food, their function being probably that of a sieve.

EDW. J. NOLAN,
Recording Secretary.

ZOOLOGICAL CLUB, UNIVERSITY OF CHICAGO.
MEETINGS OF THE AUTUMN QUARTER.

Polymorphic Nuclei in Embryonic Germ-cells.—While studying the oogenesis of *Loligo pealei* Les., the squid common at Woods Holl, Mass., I noticed that the embryonic germ-cells showed nuclei much lobed and contorted—a condition which has been observed in other germ-cells and variously accounted for as due to amitosis; to deterioration with accompanying fragmentation, to increase of the assimilating surface, etc. I wish here briefly to call attention to this condition in the squid. An account of the oogenesis will soon be completed.

Sex first becomes distinct shortly after hatching, the embryonic germ-cells being apparently indifferent. During and for a short time after the embryonic period the genital gland rests upon the left tongue of the internal yolk-lobe. Nourishment is evidently direct through the yolk-epithelium, the genital blood-vessels developing toward the end of this period. During this time the nuclei of the germ-cells enlarge rapidly and show marked lobes, bays and contortions, a centrosome occurring in one bay of each nucleus. Their descendants, the oo- and spermatogonia, also show a polymorphism of the nuclei which becomes less striking as the number of generations increases and the size of the cells decreases. These cells always lie near the blood-vessels of the gland, and their chromatin, like that of the parent cells, is never finely divided, but massed in clumps, a large clump lying near each bay of the nucleus. A similar

though less marked polymorphism exists in nearly all the somatic nuclei at this embryonic period, and is conspicuous in those rapidly proliferating stroma-cells at the hilum in which the blood-vessels form.

This condition of the nuclei in the germ-cells of the squid is due neither to deterioration nor to amitosis, for it is shown by all the germ-cells, which after attaining a large size divide by mitosis, giving rise to the oo- or spermatogonia. It seems probable that it is here caused by the rapid growth of the nucleus, together with the retention of the centrosome and massed condition of the chromatin in these rapidly dividing embryonic cells.

MARY M. STURGES.

Larvæ of Arenicola cristata.—The highly resistant organization of these larvæ renders them remarkably well fitted for artificial rearing. They may be reared from the egg in sea water kept aerated by *Ulva* up to a stage where the structure and habits of the adult are practically complete. Addition of carmine powder to the sea water seems to accelerate development up to a certain point, probably on account of the increased food supply which is thus furnished to the developing larvæ.

They leave the egg-strings as slightly elongated, strongly heliotropic larvæ with two eyespots and three body segments, each with two pairs of setæ. Prototroch and paratroch, together with a median ventral band of cilia, are present, and by their aid the larvæ swim about, actively rotating on the long axis at the same time. After a day or two they settle down and begin to form the tubes in the interior of which they undergo the remainder of their development. These tubes are of very simple construction, being composed of any convenient foreign particles united by a glutinous substance secreted apparently by certain large clear cells, situated anteriorly, which are to be regarded as gland-cells. From now on development progresses uniformly and growth proceeds as usual by the addition of segments at the posterior end. The opacity resulting from the presence of the yolk gradually diminishes as the yolk becomes absorbed, and when twelve segments

or so are present the larvæ have become almost perfectly transparent. By this time the mouth and anus have appeared and the three divisions of the intestine are established, the mid-gut, or stomach, which is very early distinguishable, being sharply marked off from the fore- and hind-guts, the latter of which is ciliated. The anterior part of the fore-gut is eversible and forms a proboscis, which appears at an early stage, and by its activity the neighboring particles of debris are taken into the intestine, and as they pass through the latter the food material is extracted, just as in the adult.

The essential habits of the adult are thus assumed at a very early stage. As the larva grows older the uniform segmentation of the body undergoes an alteration, and by the time thirty segments or so are attained there is perceptible a division of the body into two quite distinct regions, which correspond to a similar division in the adult, where the anterior part of the body, including the first eighteen segments, is of considerably greater diameter than the remaining posterior part, which consists of a large and inconstant number of very short segments of similar structure. This division gradually becomes more definitely established, and at the same time the gills make their appearance a simple thin-walled outgrowth of the body-wall, which gradually become branched in a more and more complex manner. There are thus formed eleven pairs of these structures, situated in segments 8 to 18 inclusive and containing looped blood-vessels derived from the main vascular trunks. The nephridea are already visible through the transparent body-wall, as six pairs of somewhat elongated sac-like structures situated in segments 5 to 10. The otocysts are now clearly visible; the circulation of the blood, with the contractions of the dorsal vessel and of the two 'hearts,' can be readily seen, as can also the secondary external division of each of the anterior segments into five by superficial circular grooves. At this stage, in fact, apart from this small size (12 to 18 mm.) and complete transparency, the larvæ are in both habits and structure practically identical with the adult.

R. S. LILLIE.

The following papers were also presented during the quarter: 'Caspar Friedrich Wolff

and the Theoria Generationis,' Dr. W. M. Wheeler; 'Field Work at Turkey Lake and a Series of Turtle Embryos from that Locality,' Miss E. R. Gregory; 'Recent Literature on Spermatogenesis,' M. F. Guyer; 'Eisig on the Development of the Capitellids,' Dr. C. M. Child; 'Early History of the Optic Vesicles and Accessory, Eye-like Vesicles in Vertebrates,' Dr. W. A. Locy, of Northwestern University; 'Characteristic Features of Mitosis and Amitosis,' Dr. S. Watasé; 'The Field Columbian Museum Expedition to Africa in 1896,' Dr. D. G. Elliott, Director of the Expedition; 'Protective Coloration,' Dr. W. H. Dudley.

DISCUSSION AND CORRESPONDENCE.

THE STORING OF PAMPHLETS.

A CHEAPER grade of pamphlet box than those described by Dr. Minot can be obtained, made of pasteboard instead of light wood. They are strong enough for ordinary service. Those which I use were obtained at a local bindery, not made to order, but kept in stock, and measures 11 x 7 x 3 inches. They are open at the back; the front face, 11 x 3, is covered with black cloth, to which a label is easily attached.

For pamphlets of quarto size, too large to get in these boxes, and not taking kindly to a vertical position, I have procured covers with pasteboard sides and a partly flexible back. The two sides measure each 12 x 10 inches, and the back, attached to 12-inch edges, is 3 inches wide. The outside is of black cloth, two thicknesses of which make the flexible part of the back. A strip of pasteboard one-inch wide gives stiffness to the middle of the back and a place for the label. When first put into service a sufficient number of pamphlets must be put in each cover to fill one inch in depth. The flexible part of the back, one inch on either side of the pasteboard strip, will allow an expansion of two inches before the contents require reassorting. The covers may be placed one upon another on the shelves, arranged in groups of subjects. These I find very serviceable for the larger pamphlets.

WINSLOW UPTON.

BROWN UNIVERSITY,
January 28, 1899.

NOTES ON INORGANIC CHEMISTRY.

SEVERAL months ago M. and Mme. Curie separated from pitch blende a strongly radioactive substance for which they proposed the name *polonium*. In the *Comptes Rendus* for December 26th, in conjunction with M. Bémont, they describe another supposedly new element in pitch blende for which they propose the name *radium*, while the elementary character of polonium is confirmed. Polonium in its chemical nature seems to resemble bismuth, while radium is analytically indistinguishable from barium. Indeed, it would appear, especially as the spectrum of the new substance is apparently identical with that of barium, except one line, that in their samples radium is present only in small proportion and as an impurity in barium. The claim that it is a new element is based upon the radio-activity of the substance. Barium is not radio-active, while the substance obtained from pitch blende is extremely radio-active. By solution of the chlorid in water and precipitation with alcohol the substance may be fractioned until the chlorid is 200 times more active than uranium. In the spectrum of this substance Demarey finds a line whose wave-length is 3814.8, and which is not due to any known substance. The further the chlorid is fractioned the stronger this line appears. An atomic weight determination showed a variation from that of barium only within the limits of experimental error.

IN the January number of the *American Chemical Journal* the work of E. C. Franklin and C. A. Kraus on liquid ammonia (already noticed in this JOURNAL) is continued. Since many inorganic salts are soluble in liquid ammonia, the probability of metathetic reactions, analogous to those in water, would be great. Such the authors find actually take place. Using the nitrates of sixteen metals, and the sulfid, chlorid, bromid, iodid, chromate and borate of ammonium as precipitant, it is found that those salts which are insoluble in ammonia are readily precipitated. The reactions with ammonium sulfid present the most interest, as the compounds formed differ in many cases at least from those formed in aqueous solution, as is

evidenced by their color; for example, that with cobalt is pink, with nickel and with cadmium, white. The cobalt and the cadmium compound assume the normal color of the sulfid on adding water. These seem to be complex compounds, as the precipitate from magnesium nitrate with ammonium sulfid was examined and found to correspond best to the formula $2\text{MgS}, (\text{NH}_4)_2\text{S}, x\text{NH}_3$, where x is 9 or 10.

CONSIDERING in a second paper some of the properties in liquid ammonia the authors show its close relation to water. As a solvent for salts it is only surpassed by water; it closely approaches water in its power of dissociating electrolytes; indeed, some salts conduct electricity better in ammonia solution than in aqueous solution; in many compounds it plays the same part as water of crystallization; its specific heat is as great as that of water and its molecular elevation constant is lower than that of any other substance yet measured. As a solvent it differs from water in not dissolving the sulfates and sulfites, the alkaline carbonates, phosphates and oxalates, and hydroxids. In its solvent power for organic substances it comes nearer alcohol than water. The solid ammonia is not, like water, specifically lighter than the liquid, nor does it exhibit a maximum density above its melting point. Altogether, the investigations which Professor Franklin is carrying out on liquid ammonia promise to enrich our chemical knowledge in no small degree.

J. L. H.

CURRENT NOTES ON ANTHROPOLOGY.

BAD FORM IN ANTHROPOLOGICAL WRITINGS.

IN a note to one of his recent articles Dr. S. R. Steinmetz criticises, with just severity, two faults conspicuous in some writers on anthropology (though surely not peculiar to works in this branch). The one is the appropriation, without any or sufficient acknowledgment, of the work of others. This may arise from inadequate preparation, an ignorance of what others have written, or a half-knowledge of it, as well as from deliberate intent.

The second fault is constant self-repetition and self-reference. I can name a writer whose references to his own writings exceed those to

all other authors combined. Whether this is vanity, or simply because he does not read the works of others, may be left an open question.

An author who omits references to what his predecessors have accomplished should be read with constant suspicion and distrust.

THE MANGYANS OF MINDORO.

THOSE who have read Professor D. C. Worcester's account of the Mangyans of the Island of Mindoro, in the Philippines, which he contributed to the *National Geographic Magazine* (1898, No. 6), must have finished his article with the impression that these were about the lowest savages belonging to the human species.

Professor Worcester, however, does not mention the remarkable and redeeming fact that these people are literary; that they have and have had, so long as they have been known, a phonetic alphabet and written records. I have a copy of a document in this alphabet before me, given in the appendix to Paterno's work, 'Los Itas' (Madrid, 1890); and in 1895 Dr. Foy published a study of it, with numerous examples, in the 'Abhandlungen' of the Ethnographic Museum of Dresden. A brief article on the subject, by the eminent specialist, Professor Blumentritt, may be found in *Globus*, March, 1896 (No. 11). We cannot place such a people in the status of savagery.

THE JEW AND THE GYPSY.

UNDER the above promising title, Mr. W. H. Wilkins edits a volume of the literary remains of Sir Richard F. Burton (H. F. Stone & Co., Chicago). Nearly 300 pages are devoted to these two wandering peoples. The reader who expects new and entertaining facts from Burton's wide experience will be disappointed. The essay on the Jew contains nothing that has not appeared elsewhere, and that on the Gypsy is largely taken up with an ancient and barren controversy. The only portion of the former article which contained original observations the editor thought fit to suppress.

Burton's work in ethnology, though varied and abundant, was superficial and prejudiced. He was not thorough, and his enthusiasm, for and against, led him repeatedly to adopt and defend untenable opinions. Probably the most

carefully studied work of his life was that which his widow burned immediately after his death.

D. G. BRINTON.

UNIVERSITY OF PENNSYLVANIA.

AGRICULTURAL EDUCATION IN RUSSIA.

THE forthcoming number of the *Experiment Station Record* describes the plans of the government of Russia for the establishment of a system of agricultural education. At a recent meeting of the Agricultural Council, an advisory body, of which the Minister of Agriculture is Chairman, an outline presented by the Minister was considered at length and a general plan of agricultural education was elaborated. The introductory to this document states that notwithstanding the fundamental importance of agriculture to Russia and the great fertility of some of the Russian soils, "the crops obtained even on the black soil are only one-third to one-half as large as those harvested from the incomparably inferior soils of western Europe. Almost everywhere in Russia the primitive processes of farming are persistently followed by the farmers, while the number of persons who are fitted by education and training to disseminate information on the rational methods of agriculture is comparatively insignificant." The scheme is outlined for (1) higher education, furnished by independent agricultural institutes located in the chief agricultural zones of Russia, and by chairs of agriculture and allied sciences in the universities; (2) agricultural high schools, which are in the nature of technical schools and schools with courses in agriculture; (3) lower agricultural schools; and (4) the diffusion of general agricultural information. The schools for the so-called lower education include (a) secondary agricultural schools, (b) primary agricultural schools, (c) agricultural classes, and (d) practical agricultural courses. These lower schools are to be under the jurisdiction of the Minister of Agricultural and Imperial Domains. They are to be maintained at the expense of municipalities, local communities, associations, etc., but may receive a part of their support from the government. They are to have the franking privilege for official mail matter and packages not exceeding 36 pounds in weight. The secondary schools are to be established on

government land or land donated for that purpose. The other lower agricultural schools may be established on private estates. The secondary schools are open to young men of all conditions who have completed the course in the primary public schools. The course of instruction covers four years, and includes in addition to the general studies the elements of the natural sciences, agricultural and rural economy, cattle raising, veterinary, agricultural law, horticulture, gardening, etc., together with carpentry and blacksmithing in their application to agricultural machinery. The primary agricultural schools are open to all who can read and write and have a knowledge of arithmetic as far as fractions. The courses last from one to three years. They include, aside from general studies, instruction in the elements of agriculture, with practical exercises. The classes in agriculture are intended for the instruction of young men of the peasant class. The course does not last longer than two years, and consists in the study of the rudimentary principles of agriculture and their application to the local conditions. The successful completion of the course in these three grades of the lower agricultural schools carries with it certain reductions in the military requirement, dependent upon the grade. The practical agricultural courses are designed to impart popular information in particular branches of agriculture. The instruction does not continue for more than a year, and consists in demonstrations, talks and practical exercises in different branches of agriculture in their application to local conditions, and especially to the conditions of the peasants. The diffusion of general agricultural information is to be provided for by: (1) the organization of public readings or lectures on agricultural questions for the benefit of different classes of the population; (2) instruction of the teachers in the public schools in agriculture, horticulture, gardening, apiculture, etc., and providing the public schools with small plats of land and means for cultivating the same; (3) the teaching of agriculture in the normal schools, and (4) the introduction of supplementary courses in agriculture in the village schools. There are now in Russia 3 schools for higher agricultural instruction, 9 agricultural high schools, 83 lower

schools and 59 special courses. Steps have already been taken for the establishment of about 50 additional agricultural schools.

THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

THROUGH the courtesy of the Secretaries of the Royal Society, we have received a copy of the *Acta* of the Second International Conference on a Catalogue of Scientific Literature, together with the report of the committee of the Royal Society, with schedules of classification, and hope to give full consideration to a subject which is probably the most important now before men of science. It is to be hoped that the verbatim report of the proceedings of the second conference will be printed promptly and freely distributed among men of science and scientific journals. This is especially important in view of the short time, now less than one year before the plans of the Conference are to be put into effect. In connection with this subject we quote the following editorial note from the last number of *Natural Science*:

"In our last number we gave a short account of the proceedings at the International Conference on Scientific Literature convened by the Royal Society. We did not think it necessary to say that we had abstracted this account from our highly valued contemporary *Nature*, since we assumed that the *procès-verbaux* were public property, and that copies would be distributed to the press, especially the scientific press, in due course. No copy has yet reached us, and we gather from *SCIENCE*, as well as from other sources, that no attempt has been made by the Royal Society to furnish the scientific public with any account of the work carried on by this Congress. We now recall the strange fact that the elaborate 'Report of the Committee of the Royal Society of London, with Schedules of Classification,' though bearing date March 30, 1898, was never heard of by many of those most interested until late on in the year (*vide* articles in *SCIENCE*, and by Professor Victor Carus in *Zoologischer Anzeiger*). It seems to us that the Royal Society does not realize its responsibilities. Why this shrinking from the public gaze? Are the members of the committees so afraid of criticism? This is a scheme

that appeals to the whole world of science ; it will have to be supported by money ; it will require the ardent cooperation of numerous individuals. To say the very least, it is not wise of the Royal Society to put on its usual airs of superiority and indifference in a matter of this kind. We have excellent reason for believing that the eminent and courteous Secretaries of the Royal Society are not responsible for this darkness where there should be light. Who, then, is the culprit?"

SCIENTIFIC NOTES AND NEWS.

MRS. ESTHER HERRMAN has given \$10,000 to the building fund of the Scientific Alliance of New York City. It will be remembered that about a year ago we gave an account of the plans for erecting a building for the different scientific societies of New York. Such a scientific center is greatly needed, and it is to be hoped that Mrs. Esther Herrman's generous gift will be followed by others.

MR. EDWARD E. AYER has resigned the presidency of the Field Columbian Museum, Chicago. A successor has not yet been elected.

PROFESSOR A. E. TÖRNEBOHM has been elected President of the Swedish Geological Society for 1899.

MR. W. ANDERSON, of the Geological Survey of India, has been appointed director of a survey of Natal about to be undertaken by the Colony.

THE Academy of Science of St. Petersburg has elected as honorary members the King of Sweden, the Queen of Roumania, Fridjof Nansen and M. Émile Sénart, member of the Institute of France.

M. A. LOREAU, President in 1898 of the French Society of Civil Engineers, and Count A. de Dax, Secretary of the Society, have been made by the Emperor of Russia a commander and a knight, respectively, of the order of St. Stanislas.

MR. R. T. BAKER has been made Curator of the Technological Museum of Sydney, N. S. W.

THE death is announced of Dr. Dumontpallier, an eminent Paris physician and an author of contributions to pathology, especially of the nervous system, at the age of 74 years ; and of

Lieut.-Col. Robert Pringle, M.D., of the British army, the author of numerous papers on the hygiene and diseases of India.

WE learn from the *Botanical Gazette* of the deaths of three foreign botanists, M. F. Gay, of the University of Montpellier, at the age of 40 years, a student of the green algæ, Pastor Christian Kaurin, of Sande Jarlsberg, Norway, at the age of 66, a well-known student of Scandinavian bryology, and Professor T. Carnel, professor of botany and director of the botanic garden at Florence.

THE *London Times* gives the following details concerning the Rev. Bartholomew Price, F.R.S., whose death we recently recorded : Born at Cole St. Dennis, Gloucestershire, in 1818, Mr. Price was educated privately and at Pembroke College, whence he obtained a first class in mathematics in 1840. He gained the University Mathematical Scholarship in 1842, and two years later was elected Fellow of his College. In 1844 he became tutor and ten years afterwards Sedleian professor of natural philosophy. In 1852 appeared the first volume of his elaborate work on the infinitesimal calculus ; the last of the four was not published till ten years later. This book obtained for him a considerable reputation in the mathematical world ; but his principal work in life was practical, and he will be remembered rather as the active Secretary of the University Press during the years of its first great activities after the death of Dean Gaisford, than as a mathematical professor. Bartholomew Price was a keen yet cautious man of business, and in his best days did much for the interests of the University both at the Press and as member of the Hebdomadal Council. Probably nobody of his time filled the latter post during so many years as he, or was so often called upon to be the spokesman of the Council in proposing new statutes and decrees to Congregation.

WE learn from *Natural Science* that at a meeting in Edinburgh, on November 8th, a committee was appointed to consider the feasibility of establishing a Scottish Zoological Garden. "The idea of a 'Zoological Society' was mooted, but did not, we are pleased to learn, find support. There are already three or four societies

in Edinburgh which have to do with Zoology, and any attempt to insinuate another would simply alienate the sympathies of those who would be glad to see a well-considered Zoological Garden instituted. A committee, including Professor Cossar Ewart, Dr. Ramsay Traquair, Professor A. E. Mettam, Mr. Fairgrieve, Mr. W. S. Bruce, Mr. Hope Findlay and others, was appointed, and we wish them success. We venture to predict that a successful site is to be found in the direction where holidayers do most resort. Proximity to the sea would also be a great advantage. We hope the enthusiasts and the capitalists may come to terms, and that more may soon be heard of this excellent scheme."

At the recent annual meeting of the New York Academy of Medicine both the retiring President, Dr. E. G. Janeway, and the incoming President, Dr. William H. Thomson, advocated the establishment of a research laboratory in connection with the Academy. The library of the Academy now contains 70,360 books, being one of the most extensive medical libraries in the world.

THE Chelsea Physics Garden, established in 1721 by Sir Hans Sloan, at present forms the site of the garden and buildings of the Society of Apothecaries, occupied by them at a nominal rent of £5, on condition that the garden be maintained for the purpose of botanical and medicinal study, and supply the Royal Society with specimens of fresh plants every year. The Society wishing to be relieved of the trust, the London County Council has drawn up a plan for its further maintenance. The scheme provides that the City Parochial Foundation, which is prepared to make a grant of a capital sum and a *maximum* yearly amount of £800 for maintenance, shall be the trustees. It is proposed to provide a museum, a lecture theatre, a botanical laboratory and a biological laboratory, partly in the existing buildings and partly in new buildings, which, it is anticipated, will encroach on the garden to the extent of only one-eighth of an acre. The trust is to be administered by the trustees and by a committee of management that will include representatives from the Royal Society, the Royal College of

Physicians and other institutions. Provision is made for the appointment of a Curator and other officers.

THE New England Association of Chemistry Teachers held their first annual meeting at Boston on January 28th. The following officers were elected: President, Dr. Lyman C. Newell; Vice-President, Rufus P. Williams, of Boston; Secretary, M. A. Stone, Watertown; Treasurer, E. F. Holden, Charlestown; Executive Committee, William H. Snyder, Worcester, Miss Delia M. Stickney, Cambridge, and Charles R. Allen, of New Bedford. The Association now numbers 49 members.

THE centennial anniversary of the Medical and Chirurgical Faculty of Maryland will be celebrated in Baltimore, April 25th, 26th and 27th.

A NUMBER of cases of bubonic plague have occurred on the Island of Mauritius.

DR. CARL PETERS has left London with a well-equipped expedition to explore the African territory south of the Zambesi River with a special view to the discovery of gold.

Natural Science states that Sven Hedin is classifying his geological specimens, which he will present to the High School of Stockholm, and is preparing a detailed account of his journey from Kathgar to Khotam for *Petermann's Mittheilungen*. His archaeological collection and manuscripts will be arranged by Professor Grunwedel and exhibited in the Berlin Museum, whilst Dr. Ekholm is dealing with the meteorological notes. The maps and charts, covering 552 sheets, have been confided for enlargement and reproduction to Justus Perthes, of Gotha. Dr. Hedin proposes to start on his next journey of Asian exploration about the middle of 1899. He intends to cross the Taklamakan desert twice, thoroughly explore one of the largest rivers of Turkestan, and again study the interesting Lob Nor problem. The most important part of the work will, however, be explorations in the north and interior parts of Tibet. Dr. Hedin hopes to be able to spend a winter in some of the highest alpine regions of Tibet at a height of about 15,000 feet. Then he will pay a visit to the new Viceroy of India, and will return over Himalaya, Karakoram and Kashgar. Dr. Hedin will again go alone, and

he calculates that his three years' travel will cost no more than £2,500.

It is proposed to establish in University College, Liverpool, a class for students who will devote themselves to the investigation of tropical diseases, to which end a special lecturer will be appointed, and the students will have the advantage of watching cases and their treatment in the Royal Southern Hospital. Mr. A. L. Jones, well known in the West African trade, has offered to contribute £350 a year towards the expenses of the intended special school. A general committee has been formed, which, in conjunction with a committee of the Royal Southern Hospital, will make adequate arrangements for the work in new buildings to be erected for the hospital.

At a meeting of the central committee for establishing sanatoria for consumptives on January 9th, says the *London Times*, it was stated in the annual report that there were already 20 sanatoria in Germany for consumptive patients. Regret was expressed that accommodation was chiefly provided for male patients, and attention was called to the urgent necessity of establishing sanatoria for women. A committee of ladies under the presidency of Princess Elizabeth zu Hohenlohe had carried on a good work in providing for the families of those who, as patients in the sanatoria, were debarred from earning their living. A large number of towns and also of provincial districts throughout the Empire had, through their representatives, given their adhesion to the central committee, which now numbered 466 members. At the close of the year 1898 the funds amounted to 250,000 Marks. A sum of 224,500 Marks had already been devoted to subsidizing new sanatoria, and 70,000 Marks had been promised for the same purpose. The Duke of Ratibor, the nephew of the Chancellor, made a statement regarding the congress on tuberculosis, its dangers and its prevention, which will meet in Berlin at Whitsuntide under his presidency. Invitations to attend this congress will be addressed to foreign countries. Professor von Leyden spoke on the same subject and expressed a hope that the congress would contribute to make the success of the national

movement for combating tuberculosis in Germany more widely known and that it would secure fresh supporters for this work of humanity.

CONSUL-GENERAL GOWDY, of Paris, in his annual report, says that during the past year there has been a marked increase in the adoption of automobiles, not only as pleasure vehicles, but for practical application in the way of cabs serving the public in the city of Paris, and for business purposes in the way of delivery wagons, especially those for long distances. It is announced that at the beginning of next year there are to be 100 motor cars driven by electric power running in the streets of Paris, and, if the experiment be successful, the cabs will be increased to 1,000. With this project in view, a large plot of ground has been acquired, where the building of works necessary for the housing of the cabs and the machinery for the electric supply are being rapidly completed. A training ground has also been made for the cabmen. This is laid out with every possible form of paving, wood, asphalt, stone, etc., including two steep hills. Here and there are dotted about a number of dummy figures, and in and out of these the cabmen have to maneuver, under the orders of an instructor. As a rule, in four lessons, it is stated, the driver is ready to navigate Paris and after ten lessons is considered thoroughly competent. Each cab is supplied with sufficient power to be driven 30 miles at about 8 miles an hour.

THE *London Times* states that Dr. Ferras, who has been in practice in Calcutta since 1853, in his evidence before the Plague Commission, on January 4th, expressed the opinion that there had never been plague cases in Calcutta, but simply cases of malignant fever. He remembered seeing similar cases when a student in Calcutta which were indistinguishable from plague except bacteriologically. There had been no bacteriological experts in India since the time of Dr. Cunningham. Unless Calcutta was improved structurally and the *bustis* were cleared and the overcrowded areas opened out, there was no chance that malignant fever would disappear. Captain Bingley, who had been employed on plague duty in Bombay, recommended municipi-

pal camps as a remedy for overcrowding. They had been tried at Bombay, but were not successful, as they were started too late. A camp in his own district was very successful. The people willingly paid two rupees a month, which covered the expenses and paid the interest. The plague increased after the season of the export of grain, because the rats then left the *bandars* and spread through the town in their search of food, carrying the infection with them. The *bandars* were the foci of the plague. Mr. Griesbach, Director of the Geological Survey of India, gave evidence as to the formation of the soil in the infected areas which pointed to the trap and crystalline area being specially adapted to the spread of the disease, but the witness explained that Bombay was situated near the center of the Deccan trap formation. On the alarm of the plague the people naturally spread fanlike over the adjoining country. There was abundant evidence that the tenacity with which epidemics clung to localities was influenced by the geological formation.

THE University of the State of New York announces that one of the most important of the twenty-two bulletins issued by the museum is sent to the schools this month. This is a large octavo of 156 pages, entitled a 'Guide to the study of the geologic collections of the New York State Museum,' by Dr. Frederick J. H. Merrill, Director. In the front pocket is a folded relief map showing the boundaries of the geologic systems on a scale of twenty-four miles to an inch, and the entire volume is profusely illustrated with half-tone photographs of geologic features. The general plan is such that it will serve as a guide to any other geologic collections in New York, and will also be useful to teachers in New York secondary schools who wish to direct the attention of their students to local geology. It gives briefly a digest of the New York geologic reports, with much useful introductory matter, and is meant, not in any sense to replace the small text-books, but to supplement them by giving information found as a rule only either in the larger and more expensive books which are not accessible to most teachers and students, or in a multitude of scientific papers.

FROM a Blue Book on the Straits Settlements *Nature* learns that the Perak Museum at Taiping is now overcrowded, and that there is consequently much difficulty in arranging the collections in their natural sequence, while there is practically no room for new specimens. The Taiping collections are specially rich in the ethnological and mineralogical branches, and the zoological specimens have recently been greatly improved. The photographic and botanical branches were extended during the year, and the museum now contains a valuable section allotted to economic botany. Investigations were carried out, with satisfactory results, on the subject of insects attacking coffee, rice and other agricultural products, and some experiments were made in connection with tapping rubber. Discussion has been going on as to constituting the museum at Taiping a central museum, supported by all the Federated Malay States. The curator at Taiping suggests that local museums, of which one has been in existence for several years at Selangor, and which, it is hoped, will soon be established in the other States, might either be affiliated to, or form branches of, the Federal Museum. On the other hand, the British Resident at Selangor urges that the existence of a local museum creates and sustains in the minds of the community an interest in local products, their sources and uses, which cannot fail to be beneficial and deserving of encouragement, and it cannot be urged that people in Selangor or the Negri Sembalin will obtain any advantage from a museum in Perak, however complete, which few of them will probably ever see.

IN the museum of the Royal Agriculture and Commercial Society of British Guiana at Demerara, says *Natural Science*, various changes have recently been introduced. The exhibited series of birds has been revised according to the British Museum catalogue, and over 200 specimens have been remounted. Other groups have been partially revised, so far as is possible in the absence of modern literature. It is hoped that the issue of a revised edition of the British Museum Catalogue of Fishes will enable the Curator to work up those animals as completely as the birds; meanwhile a comprehensive collection of British Guiana fishes is

being made, and preserved for the most part in formalin. Exhibition space in this museum has been extended by the addition of an upper gallery. Chief among recent acquisitions is a large series of rocks collected in the Northwest District by J. B. Harrison and H. I. Perkins, to illustrate a government report. The chief difficulty in the curatorial work of this museum is presented by atmospheric changes and over much moisture. It is satisfactory to learn that many inquiries are made at the museum, both personally and by correspondence, and that it is becoming more and more a general educating force in the colony.

UNIVERSITY AND EDUCATIONAL NEWS.

AT the annual meeting of the Board of Regents of the Smithsonian Institution, held in Washington on January 25th, an inquiry was raised as to the propriety and expediency of taking action toward the establishment of a national university, and a committee was appointed to investigate and report at the next meeting. The committee is: John B. Henderson, of Washington; Alexander Graham Bell, of Washington; William L. Wilson, of Virginia (the three members of the Executive Committee of the Board of Regents); James B. Angell, of Michigan, and Robert R. Hitt, of Illinois.

COLUMBIA University is making plans to establish a summer school during and after the summer of 1900. The courses, as is usual in summer schools, will be planned with special reference to the needs of teachers, and the resources of the Teachers College will be fully utilized.

THE Cornell Medical College proposes to establish a summer school of medicine to be given in New York hospitals and dispensaries.

THE State University of Iowa announces a course of lectures on the Elements of Anthropology, to be delivered early in March by W. J. McGee, Ethnologist in charge, Bureau of American Ethnology.

DR. E. B. MCGILVARY, of the University of California, has been called to the Sage professorship of moral philosophy at Cornell University, vacant by the removal of Professor Seth to the University of Edinburgh.

PROFESSOR C. A. KEFFER, of the Division of Forestry, Department of Agriculture, has been elected professor of agriculture and horticulture in the New Mexico Agricultural College.

MR. J. S. E. TOWNSEND, B.A., of Trinity College, Cambridge, has been elected to the Clerk Maxwell scholarship.

DR. G. MEYER, till now first assistant in the Physical Institute, has been elected to an assistant professorship of physical chemistry in the University of Freiburg. Dr. Zehnder, assistant professor of physics at Freiburg, in Br., has been called to Würzburg as first assistant to Professor Röntgen. Dr. Otto Wiedeburg, docent in physics in the University at Leipzig, has been promoted to an assistant professorship. Dr. Sidler, assistant professor of astronomy at Berne, has been given an honorary professorship. In the Faculty of Science at Nancy the following changes have been made: M. Floquet, professor of pure mathematics, has been made professor of analytical mathematics; M. Molk, professor of applied mathematics, has been made professor of mechanics; M. Haller, professor of chemistry, is professor of organic chemistry, and M. Güntz has been appointed professor of mineralogical chemistry.

Two of the more important chairs at Oxford are vacant—the Sedleian professorship of natural philosophy, so long filled by the late Dr. Bartholomew Price, and the Linares professorship of comparative anatomy, vacant by the removal of Professor Ray Lankester to the British Museum. *Natural Science* reports that the past students of Professor W. F. R. Weldon, of University College, London, are signing a testimonial to their former teacher in view of his candidature for the latter chair. Among others whose names are mentioned as candidates are Mr. F. E. Beddard, prosector to the Zoological Society of London; Mr. G. C. Bourne, who for many years has been demonstrator and lecturer at Oxford; and Mr. W. Baldwin Spencer, formerly demonstrator to Professor Moseley and now professor of zoology at Melbourne. The last mentioned is now visiting Great Britain. The method of filling chairs at Oxford is not above criticism. On the board appointing a successor to Professor Lankester theology and medicine are well represented, but not natural science.